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SEAWAYS OF THE EMPIRE

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NOTES ON THE GEOGRAPHY OF TRANSPORT

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PREFACE

This sketch is the outcome of a series of lectures, and its character is determined by its origin. It is intended to raise questions, not to solve them; to suggest lines of investigation, not to follow them out to their conclusions. The work has suffered from the pressure of war conditions; the expert has been too busy to aid with criticism, and the writer has found little leisure for revision or recalculation of complicated groups of figures. One or two friends have kindly glanced through the manuscript and have advised various additions. The advice is excellent, but impossible to follow in the circumstances. Though the book has been produced under war conditions, the war and its results are deliberately ignored. Whatever the reorganisation after the war, it will not be carried out *in vacuo;* it must be vitally related to the past. The picture of the past is the basis for the understanding of the future. Countries will still produce and consume, export and import, according to their capacities and needs; and even a world-wide war, though it may modify for a time, cannot change radically those permanent facts of geography on which the distribution of trade and the organisation of trade routes is ultimately based.

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NOTE ON DIAGRAMS

The purpose of the diagram sketch-maps is to show, at a glance, and in broad outline, the movement of British shipping, in a single year, on the main routes to and from the United Kingdom. Something is necessarily left to the imagination, since any attempt to depict, on a reasonable scale, the indirect voyages which provide the links between the outward and homeward movements and adjust the balance would only confuse the picture. The method of lines is adopted, since it is far easier to count these than to measure by eye the breadth of a narrow band. For the sake of simplicity, also, minor ports and routes have been omitted; such details can be given only by figures or by diagrams of considerable elaboration, and the diagrams are to be regarded only as approximate representations of the figures given in the text. The scale of diagrams 1, 2, 4, 5, 7, 8, 10, is uniform. In the cargo diagrams 3, 6, 9, 11, owing to considerations of space, 9 and 11 are on one-fourth the scale of 3 and 6. If an exact comparison is wanted, it can readily be supplied with the aid of a large sheet of paper and a foot rule. In diagrams 3, 6, 9, 11, the cargo and shipping scales are so adjusted that the relation between the heights of the black and white columns indicates the proportion of actual load to the theoretical capacity adopted for the whole group of ships on the route.

Shipping figures are net register tonnage in all cases; cargoes are estimated roughly in measurement tons of 40 cubic feet, unless weight is indicated.

SEAWAYS OF THE EMPIRE

CHAPTER I

SOUTH AFRICA

A MAP, common to many of our atlases, shows the World on Mercator's Projection, the British Empire coloured red, and many fine lines drawn in various directions across the seas. These lines represent, more or less accurately, the courses followed by ships, and figures may sometimes be added, giving the distances between the larger ports. This, as a rule, is the extent of the information which the map gives as to ocean routes, though diagrams are also used to give further general ideas as to the trade carried and the comparative importance of the routes. Importance is a word conveniently vague; and, since figures of values are most readily obtained, there is a natural tendency to use such figures for purposes of comparisons of routes. The result is likely to be an extremely inaccurate or misleading picture, since cheap and bulky commodities have a significance in the world of transport out of all proportion to their value. The mass of the world's trade to-day consists no longer in luxuries but in the necessaries of daily existence; such trade has become possible only through the development of shipping and railways in the latter part of the nineteenth century. The atlas

fails to give any clear idea of the real volume of goods carried over the routes marked and of the conditions of such carriage.

The investigation of the organisation of shipping routes is a special branch of the Geography of Commodities, and the full treatment of the subject involves alike the conditions of production and the conditions of transport by land and sea. We shall, for the most part, confine our attention to a small portion of the problem—that is, the geographical and economic conditions of transport by sea.

It has been our national habit, in the past, to accept the presence, in the United Kingdom, of goods gathered from all countries, and selling in our markets at a moderate price, as part of the natural order of the Universe. As supplies of tonnage were always more than ample for our purposes, the question of the economical employment of shipping was merely a matter for the shipowner, as affecting his profits; and though wasteful methods might sometimes rouse individual interests, the public, as a whole, remained unconcerned. The experience of the last three years has at length forced us to realise that, in the face of a shortage of tonnage, the economical employment of ships, in the working of routes, is not merely a matter for the shipowner or the expert, but is of vital concern to our pockets, our comfort, and even our existence. We are learning, slowly but thoroughly, that the essence of modern trade lies not in payment or exchange but in transport. A bushel of wheat, ten thousand miles away, is not in the market, and, for all practical purposes, might be on another planet. The problem confronting

our controllers and organisers is to carry the maximum possible of goods in a given quantity of shipping space and in the minimum of time. If we could re-draw our long routes, in accordance with present conditions, we should find perhaps some marked changes in direction, certainly great changes in the quantity of the goods carried, the proportion of tonnage on the various routes, and the loading of groups of ships; while the passenger traffic would be a much smaller item in our calculation. The conditions are abnormal, but the aim—economy of shipping space—should be the aim of working in time of peace, since every such economy results in lowered cost of carriage and ought to result in lower delivery price in our markets.

We are not dealing here with war conditions; but in order to form any idea of the effects of war and shortage of tonnage we must try to picture broadly the normal conditions of peace-time. The war will not alter those ultimate geographical facts on which the interchange of commodities depends, though it may perhaps lead to a more rapid development of particular sources of supply of foodstuffs or raw materials for our use. How far such development may change the character or direction of ocean traffic we can only attempt to judge after a summary of the salient facts in pre-war conditions. Such a summary we will now undertake.

In the year 1912, nearly 7,000 steamships, representing an aggregate of some 16,000,000 net tons, are recorded as entering the two main ports of the Canary Islands, Las Palmas and Santa Cruz de Tenerife. Of this vast tonnage, more than half was under the British flag. In

the remainder, nearly every European flag was represented; Germany was easily first, followed by Spain, Norway, France, Italy, and Austria-Hungary. This little group of islands, in part barren, with an area about twice that of the County of Kent, and a population of half a million, has a shipping movement which ranks it among the great ports of the World.

Some of these ships call at both ports and so are recorded twice over. The Spanish Government issues no statistics, while the figures collected by our own officials are far from clear on this point; but when every possible correction is made, including that for the piling up of the figures through the repeated visits of small vessels engaged in the local trade, the total traffic is remarkable and well worth analysis. We must remember that we are using only the records of a single year, and this, as strict statisticians warn us, is a somewhat dangerous method. Unfortunately, the method of averages would obscure the very facts on which we wish to throw light; so that we must be content to accept the risk with the warning. The year 1912 was abnormal in the Canaries. There was fierce competition in the local coal business; best Welsh was selling at a loss to the dealers and almost as cheaply as at Cardiff, so that many ships were attracted which would not usually call here for bunker coal. So we will take a round 12,000,000 tons as representing the normal movement of shipping in the Canaries before the war.

Only a small part of this movement can be accounted for by local conditions. The trade of these islands is peculiar and not without interest. The people have de-

voted themselves to certain special forms of agricultural production, so that the needs of their ordinary life must be supplied by the import of miscellaneous foodstuffs and manufactures; while the needs of the many visitors, attracted by the climate, must be satisfied in the same way. The total amount of cargo space, however, needed for such purposes is insignificant. On the other hand, there are the special agricultural exports, bananas, tomatoes, and potatoes, the last two almost entirely to the United Kingdom. More than half the bananas still come to our markets, but there is a large and growing trade with Germany and France, a trade of sufficient importance to employ vessels of a special type. We find the bananas entering our great food inlets, the Mersey and the Thames, but most of the ships carrying cargo from this country to the Canaries clear from the ports of South Wales and the Tyne. Their cargo is coal, the one commodity imported in any quantity into the Canaries. In 1912, the total was about 1,250,000 tons weight, a quantity above the average; but if we consider 1,000,000 tons as the normal yearly consumption of British coal at the islands we shall be near enough to the facts.

We will write our 1,250,000 tons as 1·2 or 1·3, for two reasons: in the first place, we save unnecessary figures; in the second, we avoid the false appearance of accuracy where none exists. The statistics of trade and shipping, with which we deal, are at best merely approximations, and we must allow ourselves a wide margin of error. It is unsafe to base any argument on small differences, especially in a single year. If we write 1·25, the significance of the 50,000 is not great; the figure merely indi-

cates that the quantity lies between 1,200,000 and 1,300,000, and probably not very near to either limit.

The coal imported into the Canaries is not needed for local industries; there are none; it is destined to supply the bunkers of steamships calling. The carrying of the coal in bulk is not confined to British ships; Norwegians are active in this as in all trades which must be worked economically. Moreover, Norway supplies the material for the crates necessary to the fruit trade, and, by a natural development, has engaged in the carrying of the fruit on the return journey.

Even with the addition of coal, the amount of shipping needed for the local trade is not great. More than five-sixths of the tonnage entering Las Palmas and Santa Cruz merely calls in transit to regions beyond; so that the full meaning of these ports will only become plain by the analysis of the working and destination of this great stream of passing ships. Owing to the nature of the statistical material, we must confine our attention, in the main, to ships under the British flag. British shipping statistics may range from poor to bad, but they can be used to arrive at certain broad conclusions; it is hardly possible to reach any conclusions of value as to the employment of foreign shipping in general on the trade-routes of the World.

Let us then consider the Canaries as a port of transit. Every year we dump into the islands enough coal to drive three thousand five hundred merchant steamers, of average British tonnage, a distance of fifteen hundred miles. To this must be added ·15 tons weight exported to Madeira, which is an alternative or additional calling-

point for ships on this route, and ·25 tons exported to the Cape Verde Islands. Nearly all this coal is for the use of steamships passing, to and from regions beyond. A map or, better, a globe may throw some light on the problem.

The Canaries lie roughly fifteen hundred sea miles from the English Channel, on the route to the South Atlantic, and three times that distance from the River Plate or South Africa. A Great Circle,* from the mouth of the Channel, clearing Cape Finisterre and the shoulder of Africa, passes through or close to Las Palmas, Grand Canary. Here, too, is a junction at which an important branch from the Mediterranean converges on the main line, while minor branches connect with the neighbouring coasts of Africa and Spain. Madeira lies slightly west of the main African route, but practically on the Great Circle to Pernambuco.

About eight hundred miles to the south-west, and farther out from the coast of Africa, but well placed on the track from New York to South Africa, lies another island group, that of Cape Verde. In products and population it ranks much below the Canaries and its coal trade is much smaller. The coal is farther from its source, so that the price is higher; and though 6·0 tons of shipping, an abnormally large amount, called in 1912, the bunkering business does not compare with that of the Canaries. None the less, from the point of view of coal supply, Madeira, the Canaries, and Cape Verde may be treated as parts of a single island group, closely related;

* A Great Circle passing through any two points on the surface of the Globe marks the shortest distance between those points.

in fact, the firms dealing in coal have normally a common arrangement as to prices and basis of working in the whole area. In 1912, these firms were mainly British, though the Germans had opened depôts and were trying to establish themselves in the business of supplying British coal to their own ships.

The main influence controlling the coal trade of the Islands is to be found in the demands of the South American traffic. Thus, the failure of the maize crop in Argentina, in 1911, by diverting ships to other markets, affected the coaling business at Las Palmas; while, in 1913, a coal-war on the River Plate, by cheapening coal there, reduced the sales at St. Vincent. The route followed by steamships is practically fixed; but they may coal at various points on that route, partly according to the price of coal, partly according to the conditions of the cargo market and the space available for bunkers. A ship naturally takes in only as much of the higher priced coal as will carry it to a cheaper coaling-point.

Nearly the whole of the great stream of traffic to and from the southern Hemisphere passes through or near the Islands; but not every ship calls. The traffic, both ways, of steamships under the British flag, to and from South America, West and South Africa, and Australasia, amounts, in round figures, to 16·0 net tons in the year. Of this total, half to two-thirds may call at the Islands, more on the homeward than on the outward voyage. Let us follow first the outward traffic, with the aid of our diagram. South of the Canaries the main stream divides, one branch making for the River Plate, with a small continuation to the West Coast of the Americas, while

the other, after throwing off a branch to the West Coast of Africa, makes for the Cape of Good Hope and beyond. The Cape stream is joined, in the neighbourhood of St. Vincent, by a smaller flow of traffic from the eastern coast of the United States and Canada, bound also for South Africa, Australasia, and the Indian seas.

Let us look more carefully at this stream to the Cape. South Africa, like the Canaries, is a calling-station for the large number of ships which skirt its shores, *en route* for more distant lands; but the region from Capetown to Delagoa Bay is also a terminus, with its own special and independent traffic; it is not a mere intermediate station on a main through line. Of this terminal traffic, only a small part finds its way through the Suez Canal, in connexion with the ports of the East African coast; while a still smaller part is linked with the trade of the West Coast. The mass of the traffic is direct, or viâ the Islands, to Capetown, Durban, or Delagoa Bay as terminal points. According to our Board of Trade statistics, ·73 net tons of British steamships cleared for British South Africa in 1912; more than half of these ships were carrying cargo to Durban. Add the clearances to Portuguese East Africa, and we have a total of well over 1·0 tons of shipping carrying cargo of some kind to South Africa. As against this, we can find only ·65 tons returning direct from South Africa. There is little or no movement in ballast, in either direction, while foreign ships have practically no share in the trade between British South Africa and the United Kingdom. It is natural to ask, Why is there this great difference between the outward and homeward tonnage; where are the lost

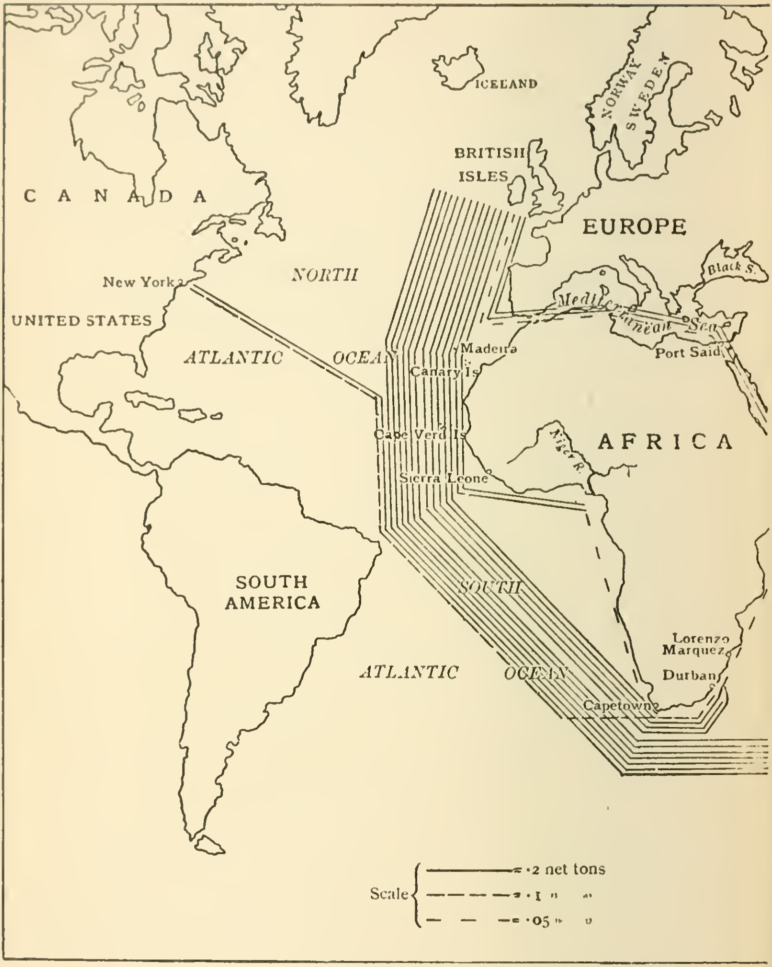


FIG. 1.—SOUTH AFRICA AND AUSTRALASIA :

BRITISH STEAMSHIPS, OUTWARD.

ships and from what country do they ultimately return, as return they must?

These figures illustrate, in a crucial form, one of the main problems in all transport, that of the balance of outward and return cargo. A ship is nearly as costly to run empty as full; so that, if paying cargo is available only in one direction, it must be charged a higher rate to cover the cost of the complete voyage out and home. This would be true, invariably, if all ships were tied, as railway waggons in this country, to more or less fixed lines; but a ship is more flexible; since the sea is free to all, it may return by the most devious routes, carrying intermediate cargo on the way. Not all ships, however, are equally flexible. The tramp wanders at will over the face of the Ocean, going wherever profitable cargo is to be found at the moment; the liner, even when mainly carrying cargo, is tied to certain routes and times. Most tied is the fast passenger and mail boat, which must go and return on the shortest course and keep to its sailing times regardless of cargo. If a ship returns direct, in the absence of cargo it must receive more in one way or another for the outward service, if the whole voyage is to show a profit. The two methods of meeting the difficulty, the indirect voyage and the higher outward charge, are both well illustrated in the South African trade.

The problem before us is to discover how far our ships trading with South Africa are profitably employed, or, in other words, what amount of cargo is available in both directions, in proportion to the carrying capacity of the whole fleet. The problem is less easy than it seems. In the first place, a ship may be built for passengers as

well as for goods, and its cargo-capacity is thus a reduced portion of its total tonnage. Again, the ship may be adapted for a special type of cargo, as meat or oil, and so may not be available on the complementary voyage for goods of every kind. Finally, even a pure cargo boat may run to regular ports and at regular intervals, thus reducing its real carrying capacity, since it is unable to wait or to change suddenly its ports-of-call in order to provide for the varying quantities of goods coming forward.

Even apart from such qualifications, how is the carrying-capacity of a ship to be estimated? The net ton of a merchant ship is a space measurement of 100 cubic feet, and the net tonnage of a pure cargo ship is the number of such units of 100 cubic feet which are supposed to be available for carrying cargo; but the goods carried are measured in tons of 20 cwt., in metric tons, in quarters, sacks, barrels, loads, often merely in numbers or values. Moreover, the shipowner may charge by weight or measurement, and *his* measurement ton consists of 40 cubic feet. Lastly, a ship, economically laden, may carry a great deal of heavy deadweight cargo combined with much measurement cargo of a lighter kind, and we must find some formula to combine the two, since both are occupying and paying for available space in the ship's hold. A ship loaded to the hatches with iron ore would sink; with a similar load of feathers she would be unstable; but there are innumerable possible combinations of light and heavy goods according to the type and build of ship. We can only base our estimates of profitable employment on the available space occupied, assuming that, in the

case of mixed cargoes, the shipowner so adjusts the relative quantities as to make the most of the full carrying-capacity of his ship.

What then is the capacity of a steamship of a given tonnage, solely devoted to cargo? If 20 cwt. of some commodity occupies 40 cubic feet, or less, it is clear that the ship could carry 2½ tons weight for every net shipping ton of 100 cubic feet; in other words, a 2,000-ton vessel could load 5,000 tons deadweight. If 20 cwt. occupies more than 40 cubic feet, she can carry less deadweight; but, apart from the question of stability, she can still load 5,000 tons of measurement cargo. This is simple arithmetic, but does it correspond with reality? The standard may be reached on a particular voyage by an economically built tramp, but it does not follow that all ships of the type, on all their voyages during a twelvemonth, will be able to obtain full loads. At the other extreme are the specialised passenger ships, of huge size but with little or no cargo-capacity; and in between are all grades of mixed cargo and passenger ships, of varying speed and construction, together with the growing class of those ships built mainly with a view to one kind of cargo.

Let us assume, for working purposes, that every ship ton of 100 cubic feet will carry, on the average of all voyages during the year, 80 cubic feet, or two measurement tons of cargo; that is, the theoretical capacity of our 2,000-ton ship will be 4,000 tons. This may be too low for routes where tramps prevail and there is much bulk cargo, as it is certainly far too high for a great passenger route, such as the North Atlantic; but it can readily be

adjusted to suit special conditions, and it is easy to calculate. Our real theoretical ship's load is x times its net tonnage, x varying for every type of ship and every combination of cargoes or of cargoes with passengers; but as some standard is necessary for comparison, we assume that $x = 2$ for the whole of British merchant shipping taken together, on the great world routes, counting all voyages for the working period of a year.

These ideas may now be applied to the analysis of the South African traffic. In 1912, the United Kingdom exported to South Africa about ·5 tons of heavy goods—iron and steel, machinery, cement and coal—together with a large quantity of textiles, boots and miscellaneous manufactures of a light kind which occupy much space and pay high rates, though their total weight, as measured in tons of 20 cwt., may not be very great. Let us assume ·75 measurement tons in all, to be carried by over 1·0 tons of shipping. In addition, there are passengers and mails, but we will not attempt here to calculate the space which they require. We will call the relation between the actual cargo carried and the assumed maximum our load-index. The cargo is ·75 m. tons, the theoretical capacity is 2·2 m. tons, the load-index is therefore about ·35; that is, the ships are carrying in a year 35 per cent. of the possible load of an average group of British cargo steamships. We must, of course, qualify this by remembering that much of the space is devoted to passengers, and that much of the cargo is of such a kind that it can pay fairly high freight rates, while some allowance must also be made for goods carried on Government account; but we shall find the figure useful for purposes of comparison. We are

dealing here with a traffic which is worked by liners rather than by tramps, and we are justified in assuming that the whole traffic, in passengers and goods, on the double journey, results in a profit to the shipowner, otherwise he would not continue to run ships and increase their number on the route. Ocean lines are not worked for purposes of philanthropy, but to pay dividends.

The outward cargo to South Africa is not excessive in relation to the tonnage available; what is there in return? We import from South Africa some copper ore, wool, feathers, maize, fruit, tanning materials, hides, and minor pastoral products; the total is in the neighbourhood of ·25 m. tons. There is no large quantity of miscellaneous manufactures to fill up the ships with light and profitable goods; the chief purchasing power of South Africa lies in gold, and gold does not freight ships. In spite of the reduction which we noted above, in the homeward as compared with the outward tonnage, our load-index is only about ·20, and the homeward voyage is clearly the less profitable. Moreover, the homeward movement of passengers is rather smaller than the outward, 27,000 as against 32,000, so we must not look for compensation in this direction. We may note that a very considerable error in our estimate of the amount of goods carried either way would not affect the general conclusion.

The weight of imports and exports is ill balanced, and it is natural to ask how this can be remedied. The only remedy would seem to lie in the development of South African products other than gold; but it must be remembered that, owing to the peculiar local conditions,

South Africa at present is an importer of those foodstuffs on which our ships largely rely for return cargoes, while she has not much raw material to offer. A change in the balance of cargoes implies a change in the course of South African development. The possibility of such change depends on the internal geographical and political conditions of the region. These are beyond our scope at the moment.

The lack of return cargo, the great discrepancy between the outward and homeward movement of goods, goes far to account for the like discrepancy in the movement of shipping. Since, however, the homeward tonnage is not reduced in proportion to the cargo, while some of the cargo cannot pay high rates, and some, as wool, is seasonal, the return voyage is less profitable to work, and outward rates are likely to be higher than on routes where the balance of traffic is more favourable. We may notice that the quantity of cargo, carried both ways, is small in proportion to the capacity of the ships, even after allowance is made for passengers. We shall realise this more fully when we come to examine other routes. Let us seek for an explanation.

The needs of passenger and mail traffic, and the increasing demand in the business world for certainty and regularity in the carriage of goods, result in the sailing of more ships than can be economically employed, in view of the character and amount of cargo available. If the movement of goods is ill balanced, the outward cargo must make up for the loss or lower profit on the homeward voyage. This is true of all means of transport, in similar conditions. Here, we must take account of

types of ships. In a free market, there is nothing to prevent a tramp loading for South Africa, at rates profitable to itself for the particular voyage, and then going on elsewhere to pick up homeward cargo; since the tramp is under no obligation to provide either a regular or a return service for goods or passengers. If a portion of the trade were carried in this fashion, certain producers and consumers would benefit; but, as the traffic remaining for the regular ships would be smaller and less profitable, freight and passenger rates would necessarily be increased, if the regular service were to continue. Regularity, frequency, and certainty, like other advantages of modern commerce, must be paid for, and South Africa is a good illustration of the fact. The same is true of our home railways, though the truth is not always recognised by their critics. To exclude the irresponsible ship, the liner companies combine, and by various means obtain a hold over the trader and a partial or complete monopoly of the carrying trade. Hence much material for public inquiry by Parliamentary Committees or Royal Commissions. Unfortunately, even Royal Commissions are unable to alter the essential facts of Geography, and it is on these that the conditions of the carriage of goods by sea ultimately depend.

We have glanced briefly at the direct South African service; let us now follow those ships which are worked on a more flexible method and solve the problem of return cargo by resorting to the indirect homeward voyage. There are two possible areas where heavy cargoes for western Europe are to be found at some time in the year; these are India and Australia; South America, for reasons

which will appear later, is not available. So, ships which have carried cargo to South Africa may clear in ballast either S.E. or N.E.; India is perhaps the more likely destination. The eastern coast of Australia has the disadvantage of distance, as compared with India, while the west is not a very large source of cargoes. Australia, too, is, as we shall see, fairly well supplied with tonnage for her direct European trade. The Indian route is preferred for another reason. Not only does India always offer cargoes for Europe, it is also prepared to import coal. The cost of production of coal in Natal and the Transvaal is low, so that large quantities are railed to the coast, mainly for the bunkers of steamers, while a small but increasing quantity is exported in bulk. South African coal is to be found on the Indian Railways, and at Bombay and Colombo, where it is sold side by side with Indian, Australian, and Welsh. The traffic is small at present, but its growth will tend to enhance the advantage of the return voyage viâ India and the Suez Canal. On a small scale, it is operating in the same way as the vast coal export of the United Kingdom as a factor in the economical employment of shipping; though the development of South African coal will not assist in the solution of the problem of direct trade with Europe.

There is one other possible source of return cargo which must be noticed, since it lies very near to the direct route. We marked a branch from the main line of traffic diverging to the west coast of tropical Africa; the question arises, whether this region, with its very different products, could supplement the South African cargoes for Europe. Let us consider the trade of part of this area.

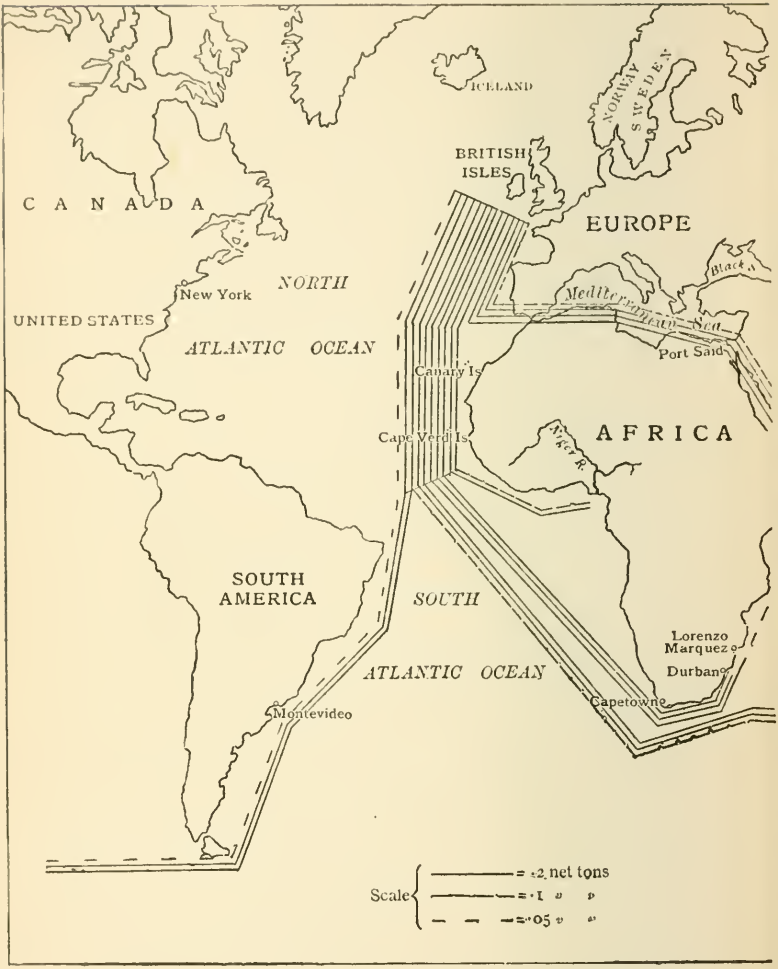
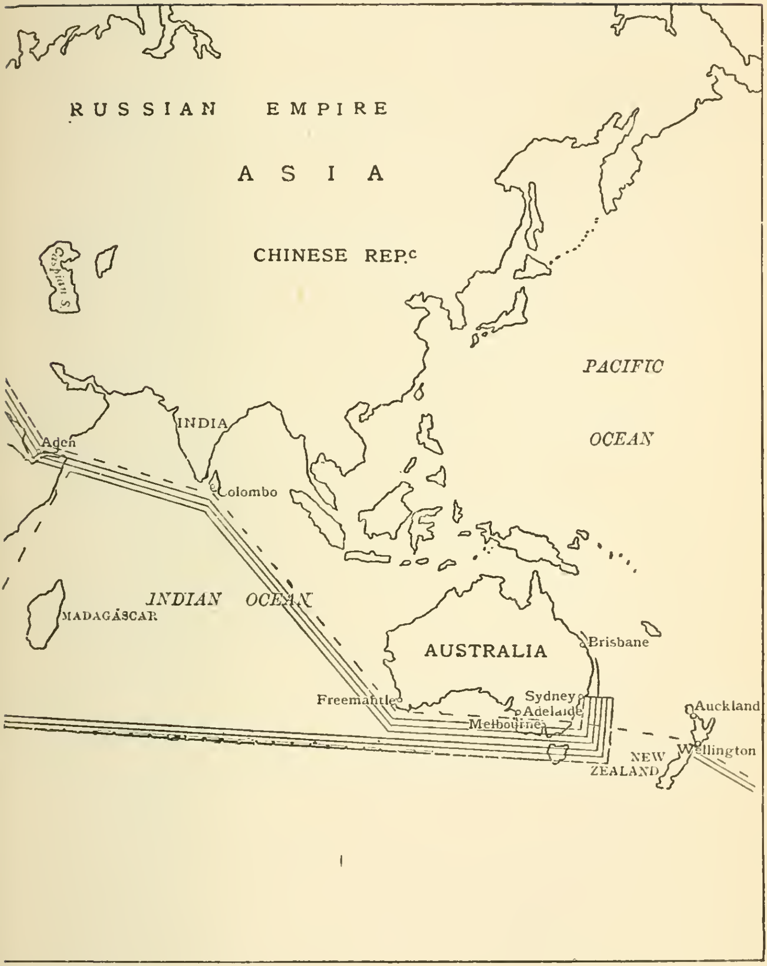


FIG. 2.—SOUTH AFRICA AND AUSTRALASIA :



BRITISH STEAMSHIPS, HOMEWARD.

Grouping together Sierra Leone, the Gold Coast district, and Nigeria, we find ·35 tons of British shipping cleared to the area with cargo, but only ·27 tons returning direct. This hardly suggests employment for the surplus South African shipping; in fact, the conditions of the two regions are parallel. The same is true of the movement of goods; on the outward voyage, about ·4 m. tons is available, nearly half being coal, while the return is only about ·2 m. tons. Our load index is ·57 for the outward and ·37 for the homeward voyage, and there seems to be, just as in the case of South Africa, a surplus of empty tonnage seeking return cargoes elsewhere. To the rest of the West African coast, also, mainly owing to the movement of coal, there is a heavy excess in volume of exports from the United Kingdom. It is likely that the export of the products of this region will increase in the future, but the imports will tend to keep pace, and part of the traffic must always remain rather difficult and costly to work, owing to the character of the coast and the absence of convenient harbours. The East African development is even smaller, and neither area seems likely to affect to any extent the peculiar South African conditions, at any rate in the near future. We could attempt a forecast only after a careful study of the geographical conditions of the two areas.

We started out to discuss the geography of a trade-route; we have found that we must consider the technical working of the ship and of groups of ships. A railway line, without rolling stock, is simply a mass of steel and timber, though it indicates certain possibilities of traffic; an ocean route, without reference to ships, is a mere abstraction, a line on the map without meaning. The route

is not even a fixed line, but is subject to wide variations; the ship creates its own track for the time being, and the direction of the track is in turn determined by the character of the ship as a working machine and the availability of cargo. The last is almost entirely a matter of economic geography, in the full sense of the term. If a considerable number of ships, during an appreciable period of time, follow the same track, for similar purposes, we are justified in marking that track as a trade-route; but we must remember that each route has its own special character, and that our lines on different parts of the map have not the same meaning. The routes have not the fixity of the railway track, but are liable to changes even from one year to another, with the variation in crops and seasons, as well as to slower changes depending on the gradual development of the regions which they link together.

We may now begin to realise the grounds for our representation of ocean routes, not as thin lines on the map, but in rough quantitative form, as so much tonnage and so much cargo moving from one port or region to another during the period of a year. We are dealing with material things, not with abstractions, and the more we aim at reality, the more difficult and complicated shall we find the expression of the facts. The geography of movement is far from being as simple as is often represented.

A preliminary investigation has brought to light certain principles or facts which recur, in one form or another, in every part of the world. A group of islands, in themselves insignificant, and subject to foreign control, are found to be of vital importance to British shipping,

partly owing to their position in relation to the main steamer tracks, partly as convenient depôts for bunker coal. The supply of coal for bunkers is largely a matter of price, and this in turn is closely related to the question of distance from the coal-fields and cost of transport. The geography of position is thus subject to economic modifications, and every new discovery of fuel changes a whole group of distance relations.

Again, the movement of ships and the variation of freight rates are not to be treated of in terms of mere distance; the amount and character of the cargo available, the type of ship, and the nature and efficiency of the services rendered, must all be taken into account. The most vital problem involved in the employment of shipping and the profitable and economical working of a route is that of the balance between outward and return cargoes. The want of balance, in a particular region, is the main determining cause of the indirect return voyage adopted by a large amount of tonnage.

Finally, the ultimate determining element in the employment of shipping lies in the sum of the geographical conditions of each region in relation to those of other regions of the World, though the effect of such conditions may be modified greatly by economic or political policy on the part of individuals or Governments.

CHAPTER II

AUSTRALASIA

We have seen how coal, as cargo, is useful in South Africa to a certain number of outward-bound steamers, as an alternative to ballast; but coal, for bunkers, is at present far more important, since it concerns every ship passing or calling at South African ports. At Durban, we find Natal coal, very cheap; at Capetown there is sea-borne coal from Natal, with some rail-borne at specially low rates from the Transvaal mines, selling side by side with Welsh. The last is a declining element in the trade, though at one time it had a monopoly and gave employment to a considerable number of tramp steamers bringing it from Wales. In 1912, the amount exported from the United Kingdom to South Africa was only about ·05 tons weight, as compared with nearly ·7 tons in 1902, the year when the trade reached its maximum, and with ·2 tons as early as 1882. According to official figures, a total of 1·4 tons was supplied to steamers in South African ports in 1912, so that the bunkering business was equal to that of the Canaries. The greater part was shipped at Durban, the rest mainly at Capetown. The coal was partly for ships sailing from South Africa to the United Kingdom or western Europe; but its chief importance lies in its relation to the traffic to and from Australasia.

Capetown is the halfway house between the United Kingdom and Australia. So long as it was necessary to bring the coal from South Wales, the more favourable position of Capetown, in comparison with the Canaries, as a calling-point on the long voyage, was offset, to some extent, by the higher price of coal. South African coal, selling cheaply at Capetown, has entirely changed these conditions. It is true that, in steam-producing power, this coal is inferior to Welsh by some ten to fifteen per cent., but the lower price more than compensates. At Capetown, in 1912, Natal coal was selling at about 24s. per ton, trimmed into bunkers, while the small quantity of Welsh coal imported was sold at a very much higher rate. At Durban, the price for local coal was as low as 14s. on the wharf.

South African coal is not merely competing with British coal, directly at Capetown, and indirectly in the Islands; it is also affecting the whole organisation of steamship communication with Australia. A glance at the movement of shipping between the United Kingdom and Australia will made this fact clear. There is a choice of routes to Australia—round the Cape or through the Suez Canal—and there are no accurate figures distinguishing the proportion of traffic which moves by each route. The total outward movement of steam shipping from the United Kingdom to Australasia is, in round figures, 1·6 net tons. Of this, possibly seventy-five per cent., or 1·2 tons, goes by way of the Cape, the Suez route being more and more limited to mail vessels. To the Cape stream must be added some ·2 tons of British shipping bound for Australasia from the eastern seaboard of North

America, mainly that of the United States; and taking account also of ships from America bound for South Africa and the Indian Ocean, we have about a million and a half tons of shipping either passing or touching at South Africa on the voyage eastward. This great mass of tonnage, with the exception of the ships from America, is not concerned with the local trade of South Africa; that is dealt with sufficiently by the 1·0 tons already noted; so that, of the total stream of merchant shipping making for the southern point of Africa, about two-fifths may be defined as local and three-fifths as in transit eastward. This gives some measure of the amount of tonnage affected by the development of the coal resources of South Africa.

The return traffic from Australasia is more difficult to trace and account for than the outward. The total amount of shipping entered from Australasia at the ports of the United Kingdom in the year is about the same as that cleared to that region. This is in contrast with South African conditions, and suggests that Australasia provides homeward cargoes for all the ships cleared outwards in the direct trade. The distribution by routes, however, is very different from that on the outward voyage. A reasonable estimate gives ·65 tons of steamships through the Canal, ·5 round the Cape, and ·45 by way of Cape Horn. The explanation of this contrast is partly geographical, partly commercial, as we shall see. The ships which we noted coming from the United States do not seem to return direct to that country either with South African or Australian cargoes; they may perhaps be traced later as units in the great stream

of traffic moving westwards from Europe across the Atlantic.

Let us now examine the two lines of traffic to Australia, and ask on what principle the division may be made. There is a natural tendency to settle the matter offhand, by a mere comparison of geographical distances as measured on the Globe; but it must be remembered that the purpose of a ship is to carry passengers and cargo, and that the chief ports of the world are not always arranged conveniently along a series of Great Circle routes. For the ship, as a commercial proposition, and not a machine operating *in vacuo*, the longer way round may be the more profitable. The profit is determined by the character and quantity of passengers and goods to be carried—in other words, by ultimate geographical conditions.

As commonly stated, the distance from London to Melbourne, in sea miles, is about a thousand miles less by the Suez Canal than by the Cape. But the chief purpose of a ship using the Canal route is to pick up overland passengers and mails in the Mediterranean. This involves divergence from the shortest course, and there is also loss of time in traversing the Canal, which is equivalent to an increase in distance. In fact, the supposed advantage in distance tends to disappear; and if allowance be made for these divergences and delays, the advantage may be found to be slightly on the side of the Cape route. Moreover, the amount of the Canal dues, about 5s. per ton before the war, must be taken into account in estimating the total cost of the voyage. On the other hand, though the route offers only one important

calling port for passengers, and no profits on cargo, yet the great growth of Australian traffic in recent years has been by the Cape. To appreciate this fact, we must consider the history of the merchant steamer as a working machine.

The first result of the opening of the Suez Canal was to divert from the Cape route a considerable amount of the growing Australian traffic, especially on the return, in the matter of imports into the United Kingdom. The steamer of those days was not well fitted for long voyages without re-coaling, or for encountering the heavy seas and winds of the Southern Ocean; in fact, if she carried enough coal in her bunkers for a long voyage, she would have little room left for ordinary cargo. The Canal offered more points-of-call, coaling-stations at shorter intervals, and better weather conditions. Moreover, the really important traffic at that time was with India, where the advantage of the Canal over the Cape route is at its maximum.

The diversion of traffic to the Canal was accelerated by the rapid substitution of steam for sail in the British mercantile marine. On the Cape route, the sailing ship had a great advantage in the favourable Westerlies of the Southern Ocean; and here, even to-day, a considerable number of large sailing ships are still to be found working. The conditions for the steamer are now changed. The modern cargo vessel, of better construction and with more efficient engines, extracts a greater amount of work than its predecessor out of a ton of coal and needs a smaller proportion of its total available space for bunkers. It can steam a far greater distance without re-coaling, and it is much less affected by adverse weather. As a

consequence, the saving of the Canal dues is sufficient inducement for cargo boats to use the Cape route. Again, advantages are gained by the employment of larger and still larger ships, as only a large steamer can give both speed and great carrying-capacity combined with economy in working; so that some of the ships in recent years trading to Australia have been of a draught too deep for the Canal. Though the Canal is being deepened steadily, the ships tend to keep ahead of its capacity.

Let us now analyse more closely the Australian traffic. In 1912, of the total number of steamers outward-bound by the Cape to Australia, over three-quarters touched only at Capetown; on the return, less than a third called there, and most of these had called already at Durban. How is this to be explained? Let us examine the globe. The shortest route from Capetown to Melbourne or Hobart would be along a Great Circle from Cape Agulhas; but, as this would carry the ship too far south, into dangerous waters, the usual course, passing near the island of St. Paul, represents a compromise. To coal at Durban would involve the loss of three or four days, as an offset to a saving of 7s. to 8s. on the price of a ton of coal; so that most ships seem to find it cheaper on the whole to take in coal at Capetown and then set a course for the south-east corner of Australia. Ships using the Canal may take the direct course through the Indian Ocean, by way of the Chagos Archipelago, or diverge to call at Colombo; in either case they strike the south-west corner of Australia.

The division of the return traffic is determined by conditions partly geographical, partly economic. The two

chief Lines serving New Zealand follow the sailing route, round the Horn, and, after touching for coal at the River Plate, join the homeward stream through the Atlantic in the neighbourhood of the Canary Islands. Of the tonnage returning direct from Australia, rather more than half is to be credited to the Suez route. This is due partly to economic considerations. The regular arrival of Australian wool is important from the point of view of market organisation, while regularity, in former days, was not a striking characteristic of the Cape route. The shippers seem still to prefer the Canal, though the steamer of to-day is capable of both speed and regularity on the Cape route, in defiance of weather conditions. This preference for the Canal may perhaps be regarded as a case of survival, or economic inertia. Very many ships, however, return by way of South Africa, though not always on exactly the same course through the Southern Ocean as on the outward voyage. A weak-powered steamer is unable to face the full force of the Westerlies, while even the most powerful ship must either burn more coal or take more time than on the voyage eastward. A more northerly, though longer course, traverses a zone of better weather. None the less, either in time or in cost of running, the return is more expensive than the outward voyage. The geographical conditions which prohibit the return of sailing ships by the Cape must be taken into account even by the latest product of engineering science. The modern counterpart of the legend of Van der Decken is to be found in the coal bill of the steamer. A more northerly course brings the ship near the latitude of Durban; and we have seen that, as a matter of fact, most

of the homeward-bound ships bunker at that port rather than at Capetown. Thus the conditions of navigation in the Southern Ocean are not without influence on the commercial growth and competition of the two great rival South African seaports. Later, we shall compare them with respect to another group of physical conditions.

Such is, broadly, the movement of British steam shipping to and from Australasia. Now we must consider the work which it is capable of doing and how much it finds to do. Of the total mass of shipping, outward-bound to Australasia, over 1·0 tons has Australia as its final destination; while the remainder rather less than ·5, goes on to New Zealand. Nearly all this tonnage is of the regular liner or cargo-liner type. Let us examine first the Australian trade.

The mass of our heavy exports to this, as to most distant markets, consists of manufactures of iron and steel, machinery, and large quantities of chemicals and cement; the whole occupying well over three-quarters of a million tons of shipping space. Adding to this our large export of textiles and miscellaneous manufactures, we may estimate a total of about 1·2 m. tons of goods for the ships to carry. This, for the moment, leaves the sailing ships out of account; but, allowing for the reduced cargo-capacity, due to the passenger and mail traffic, we may conclude, perhaps, that the exports from the United Kingdom to Australia provide fairly profitable employment for the shipping on the route. The load-index is about ·55, which may be compared with that of ·35 for South Africa; but it is higher for the Cape than for the Canal route, owing to the different character of the traffic

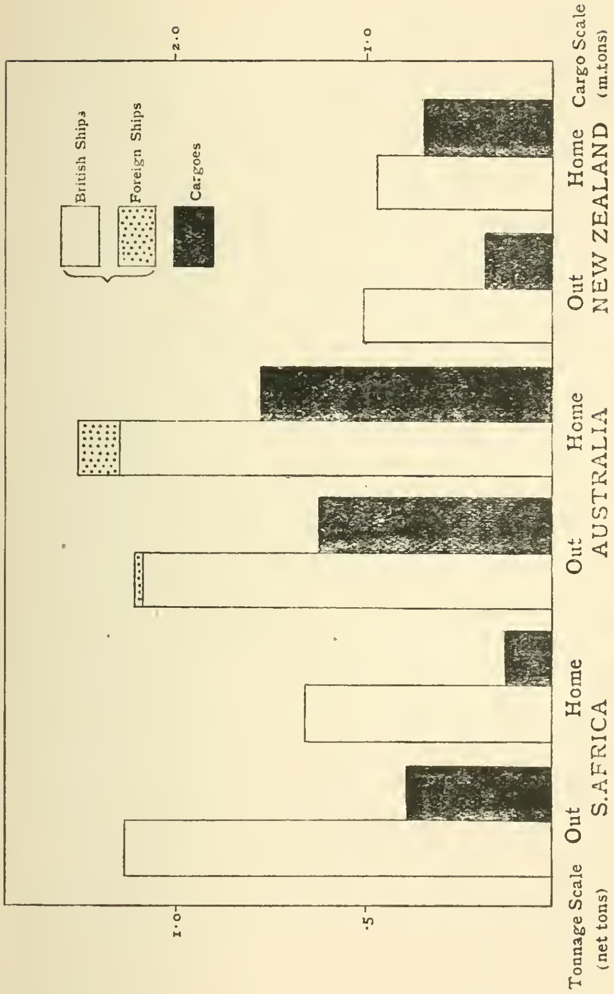


FIG. 3.—SOUTH AFRICA AND AUSTRALASIA.
All ships with cargoes, outward and homeward.

handled. This figure is really only a possible figure, obtained by ignoring the work both of sailing ships and of foreign competitors; but the necessary correction is not very great and applies mainly to the cheaper class of goods. The steam traffic from the United Kingdom to Australia is for all practical purposes entirely under the British flag; but, of some fifty thousand tons of sail, cleared from our ports with cargo, about half was foreign. The allowance for sail reduces our load-index by two or three per cent. Against this may perhaps be offset the considerable quantity of Continental goods carried in British ships either direct or viâ our own ports.

The return cargoes from Australia are mainly bulky goods, or else products such as meat and fruit which are handled in specially fitted vessels. The foodstuffs alone, wheat being the chief, are well over 1·0 m. tons, and there is at least another ·5 m. tons of wool, cattle-products, ores, metals, and timber. As in the case of South Africa, there are few minor miscellaneous manufactures. The load-index works out at about ·7, after allowance is made for ·15 tons of sail, of which two-thirds are foreign. This suggests that the conditions of employment are more favourable on the homeward voyage. Here again we must take account of passengers. The total number of passengers for the Commonwealth, in 1912, from the United Kingdom, was about 84,000, while the arrivals were only 15,000. Thus, on the outward journey, if we regard the employment of shipping as a whole, the emigrant traffic compensates, to some extent, for the deficit of goods. The number of passengers carried outward is greater in proportion to the tonnage than in the case of

South Africa, while the balance is in the right direction.

British ships are not by any means confined to the direct trade with the United Kingdom. Western Europe demands certain Australian products, notably wool and ores, and our ships have a large share in this trade, particularly to France and Belgium. Australian statistics record nearly ·2 tons of British shipping as cleared with cargo to Belgium and France, but practically none as entered from these countries; while Antwerp acknowledges ·25 as entered from Australia, but none as cleared. Some ships may go direct to foreign ports, others may call first at ports in the United Kingdom; but the proportion so calling cannot be calculated. In short, apart from agreements and limitations adopted by the great steamship organisations, the North Sea and the Channel constitute a single area from the point of view of shipping, and it is hardly possible to isolate the shipping movement of a particular port by any method of compiling statistics. The Australian trade figures may give some further indication of the division of traffic. In 1912, the imports into Australia from the United Kingdom were valued at £46·0, and from western Europe at about £10·0; on the other hand, the exports to the United Kingdom were £31·0, while those to western Europe were about £23·0. These figures include the precious metals, and are only a rough, a very rough, index to the quantity of the goods; but it is clear that the homeward traffic to the Continent may provide considerable additional employment for our shipping, even after deduction is made for the carrying-capacity of our foreign competitors.

So far we have considered the direct trade between the United Kingdom and Australia, but we have not yet completed our review of the British shipping employed on Australian routes. We noticed before a considerable tonnage of British ships carrying goods from the eastern United States to South Africa and Australia, but we could not find them returning direct to their starting-point. Australia is a valuable market for American manufactures; but the only Australian product likely to be imported, in quantity, into the eastern United States is wool, and that is obtained mainly through the London market. So the ships are available for other purposes. We noticed also that some ships, after discharging cargo in South Africa, sailed in ballast to Australia. Ships sail to a country in ballast because they expect to find cargo there; but the movement of goods to the United Kingdom is already provided for sufficiently. The trade to Continental Europe may occupy some of this surplus tonnage, but there are other possible destinations for Australian cargoes.

Australia sends foodstuffs to South Africa and receives little in return. The ships carrying these cargoes may go east again in ballast, or perhaps load coal for the Indian Ocean; though this traffic does not provide work for any very large amount of tonnage. We find, too, another stream of ships in ballast entering Australian ports, from South America, particularly Chile. So there is a convergence of empty tonnage on Australia both from east and west. Evidently Australia exports, on the whole, a much greater quantity of goods than it imports. The explanation is to be found in the presence here of another

bulky commodity, coal, a commodity which does not provide cargoes for Europe. The total weight of Australian coal exported is rather more than double that of wheat; it amounted, in 1912, to over 2·0 tons; but the coal and wheat are destined for widely separated markets. Roughly, a quarter of the total coal exported is carried to the Indian Ocean and the islands of south-eastern Asia, and we find Australian coal on sale for bunkers at most of the important coaling-stations. Of the remainder, over 1·0 tons is destined for the west coast of the Americas, especially Chile, where it again encounters Welsh coal. The surplus is scattered widely over the islands of the Pacific, a large quantity going to New Zealand. So, a ship entering in ballast, either from east or west, may load coal for the Indian region and thence return to Europe with cargo, or it may load for South America and return to Australia in ballast, or perhaps continue to Europe with a cargo of nitrates. This is very different from the regular to-and-fro movement of the liner, but it is necessary for the full development of Australian trade. In Australia, as in South Africa, the movement of coal, to regions lacking it, is an essential element in the employment of shipping, and it also involves the indirect voyage. Evidently this method is not available for the passenger liner, or even for the pure cargo liner—a cargo boat running to scheduled time and place—which is tending to develop on this route.

New Zealand has a heavy local traffic with Australia, but its relations with Europe may be treated apart, since it offers an important market for our manufactures and has much to send to us in return. As might be

expected, the goods exported from the United Kingdom to Australia and New Zealand are of the same character. The total quantity to New Zealand may be estimated at ·35 m. tons; and to this must be added exports from Continental Europe, which are carried entirely in British ships. This gives a load-index of ·37 for the outward voyage. The homeward loading, mainly of meat, wool, and pastoral products, approaches ·7 m. tons, though the proportion to the Continent is smaller than from Australia; and the load-index is about ·74. As the trade is carried entirely in steamships, there is no correction to make for sail. The homeward is heavier than the outward traffic in goods, but the opposite is true of the passenger business. In 1912, 13,000 passengers from the United Kingdom are recorded as landing, and only 2,600 as embarking. This movement may compensate to some extent for the lack of balance in goods. Complaints as to high rates of freight have been freely made by the merchants of New Zealand; the lack of balance in cargoes and the distance of the country from its chief markets may have some bearing on these complaints.

The Australasian region, in spite of its small population, is an important market for British goods, since the trade per head of the population is unusually large. It offers, in return, heavy cargoes of foodstuffs and raw materials, together with valuable and specialised kinds of goods, as meat and butter, mainly for the markets of the United Kingdom. The region also imports considerably from North America, and exports to France and Belgium, in both cases largely in British ships. The trade with the United Kingdom is carried on, for the most part, by regu-

lar boats, and is therefore to some degree expensive. The expense is increased by seasonal variations in the amount of goods coming forward for transport; Australian wool, which occupies much cargo space, shows a marked seasonal movement, the greater part arriving in the United Kingdom between November and May. Regular ships and irregular cargoes do not agree. The route, especially by the Cape and Cape Horn, presents wide expanses of ocean, with few coaling-ports or ports-of-call; so that its development and working have been closely connected with the improvement in the type of the ocean steamer.

Experts tell us that, within somewhat wide limits, the larger the ship the greater the economy of working. They tell us, also, that the higher speed demanded by the methods of modern commerce, for goods as well as for passengers and mails, can only be obtained, at a reasonable cost, by increasing the size of the ship. This increase involves greater length, and more especially greater draught. Hence, on the Cape route, a great development in the size of merchant ships, even of those adapted purely for carrying cargo. The growth of the ship is limited by the capacity of the harbours which it visits; how then is this capacity to be measured? The only satisfactory standard of measurement, for a modern port, is the depth available at practically all times and seasons. The element of time is so important, in the handling of traffic to-day, that a port accessible only during part of the twenty-four hours to the largest ships which use it may be severely handicapped in the competition for trade. A large number of the great ports of the world have at present an effective minimum in the neighbour-

hood of thirty feet at low water; this gives a useful basis for comparison. The draught of the ship must be less by three or four feet, according to local conditions. The large modern steamer is not well adapted for scraping the bottom or lying on the mud; it must always have water under its keel.

Let us now apply this standard to the Australasian route. Capetown harbour, in one part of its area, has thirty-six feet, and this could be improved to forty; any greater deepening would be costly, since the solid rock is reached. Durban has over thirty feet in the entrance channel, and this could be dredged to forty without much difficulty; but the depth on the bar would not be effective, since considerable allowance must be made for the action of the waves in dropping down the ship's keel. The depth in a canal and in the open sea are not to be measured by the same standard. East London and Port Elizabeth belong to a lower class of ports, consisting of those with a depth of twenty to twenty-five feet; in fact, Port Elizabeth is merely an open roadstead for large ships.

Fremantle, Albany, and the outer port of Adelaide, come within the thirty-foot group; even Melbourne can have no higher place, since the greater nominal depth, approaching forty feet at Port Philip Heads, is discounted by the great " scend " due to the heavy swell rolling in at certain times from the south-west. Here again we find that the broad climatic conditions of the Southern Ocean have a direct bearing on the economic working of shipping. The conditions at Melbourne are of more than local importance, for Melbourne is the key to the eastern coast of

Australia; a ship which is unable to call here will find its trading capacity seriously restricted. On the east coast, Brisbane and Newcastle are ports of the second class, while Sydney and Hobart alone have an effective forty feet. Hobart may be useful as a port-of-call, but its cargo movement is limited by the size of Tasmania. Wellington ranks with Sydney, while Auckland could easily reach the same standard of depth; the rest of the New Zealand ports fall well below it. We may, then, subdivide our first class into two groups, that which is near an effective forty feet at low water, and that which is nearer the thirty-foot minimum. The tendency is for the latter, by progressive improvements, to approach the former in capacity.

The problem of the adaptation of the steamer to the port or the port to the steamer is not peculiar to the Australasian route; but the growth of the size of ships, the comparatively small number of ports concerned, and the conditions of inland transit, have combined to make the problem critical in this area. The ship, aiming at economy combined with speed, tends to increase in size up to the limit of harbour accommodation. Some harbours have enjoyed from the first good natural conditions; others, urged by competition, have created facilities at heavy cost. Trade makes the harbour as often as the harbour makes the trade. Improvements are often progressively costly; the work of dredging and keeping clear each extra foot of depth in a channel is not infrequently on an increasing scale. Whether the expense is shown directly in the form of harbour dues imposed on ships entering, or whether it is obscured by inclusion in the general tax

accounts of a country, makes no difference. In the end, the trade of the country pays. Where the cost of improvements is apparent in the form of harbour dues, we see at once that the lowered cost of transport of goods, due to the economical working of the larger ship, may be offset by higher dues, if the improvement of the port is carried too far. Moreover, owing to physical conditions, only a limited number of ports can attain great depths at any cost which their owners are likely to incur. If the traffic concentrates on these favoured ports, there will be need of heavy transhipments, and the risk of congestion on certain lines of inland transport. The trader is concerned with the total cost of transport of goods from producer to consumer, not merely with that portion represented by payments to the great ocean Lines; there is no advantage to him in the possible lowering of rates on one part of the journey if this is balanced by delays and higher costs due to transhipment or handling at the port or on the railway. The great ports may gain, but at the expense of their smaller neighbours; from the national point of view this may, or may not, be an end to be desired. The ship itself, in so far as it is limited to a few large ports, loses something of its efficiency and flexibility; sufficient cargo, in the ports visited, may not always be available for full and profitable loading. Moreover, we must not treat one section of a route, or even the route as a whole, as an isolated fact; we must take account of terminal ports in Europe, and also of the possibility of transferring a ship from one route to another. Too much specialisation to suit particular conditions is not without its peculiar risks.

The most economical size of steamships must vary on different routes, according to the needs and character of the trade in all its bearings; so that no fixed standard can be set up. The tendency towards great size, the narrow shipbuilder's point of view, without reference to other elements in the cost of transport, may, like the increase in speed, result in a higher total delivery-cost for the goods. Speed has its advantages, which must be paid for, but even these advantages can be bought at too high a rate. Apart from possibilities of economical working, size is of no great advantage, except perhaps for advertisement or national boasting; it is a luxury, and the next generation is not likely to have too much capital to spare for the provision of luxuries such as steamers of forty-foot draught and upwards. Not many Port Authorities are likely to be in a position to endorse the statement of the engineer of one of the great ports of the southern Hemisphere: "We intend to be an up-to-date port, whether it pays or not!"

In the Canary Islands, coal appeared in a simple form, as so much material dumped down at a point convenient to steamers calling. South Africa illustrates the twofold effect of the development of a local source of supply, in attracting steamers both by the provision of coal for bunkers and by the prospect of cargoes in bulk. In Australia, a terminus of routes, the most important effect of the coal is to be seen in the growth of a large export trade, in various directions, and a corresponding employment of shipping to a large extent independently of the main traffic with Europe.

The Australasian routes also illustrate, in a sufficiently

marked fashion, the effects, direct or indirect, of weather conditions on modern shipping, both in the actual courses of steamers and in the survival of sail in competition with steam. The comparative simplicity of the routes, the scarcity of harbours, the great expanses of ocean to be traversed, the character of the cargoes, and the unity of political and commercial control, all contribute to enforce the importance of the problem of the large and economical steamer, fitted for the carriage both of cargoes and passengers. The whole region has developed, in recent years, on the basis of the liner rather than the tramp.

CHAPTER III

INDIA AND THE FAR EAST

The Suez Canal is an important factor in the Australian traffic, while the movement through it to and from East and South Africa must not be entirely neglected. For the rest of the traffic, between Europe and the Indian Ocean and the whole seaboard of Eastern Asia, the Canal is the only route which we need consider.

To the present generation, the Canal is so much part of the natural order of things that we are prone to forget its comparative youth and to ignore the profound changes which it produced, in a short period of time, in the organisation of ocean shipping and the trade of the World. Let us go back for a moment to the days of our grandfathers, when Egypt was independent of Europe, and steamships were still an experiment, distrusted greatly by old-fashioned patriots.

In the thirties of the last century, Parliament was much concerned about the question of steam communications with our most important colonial possession, India. So, in 1834, we find the inevitable Committee, reporting on the question of steam navigation with India, and another Committee, in 1837, dealing with the same subject. The chief alternatives were the Cape and Suez routes; but the overland, by way of Mesopotamia and the

Persian Gulf, was not without its advocates. The problem was mainly technical: Could a steamer carry enough coal for the voyage across the Indian Ocean; could she, with a speed of some six knots, force her way westward from Bombay against the South-West Monsoon; and how could she be coaled on the voyage by the Cape route? The experts differed greatly on these points, but there was a general agreement on the opinion that a steamer could not carry cargo in addition to the necessary coal.

The shipowners disproved the statements of the pessimists, not by argument, but by experiment. A steamer of the East India Company's service made trial trips to the Red Sea, and, by 1837, arrangements were being made for a monthly service between Bombay and Suez. Dr. Dionysius Lardner, of Encyclopædia fame, was prominent in the controversy; he distinguished himself by advocating the building of steamers of the great size of 1,000 tons and 250 horse-power. The official engineers naturally proved to their own satisfaction that this could not be done. Lardner had other practical notions. He pointed out that coal could be supplied at 10s. per ton f.o.b. in England, while its price at Socotra was 60s.; at the same time, many ships were in the habit of sailing to India in ballast. The obvious economical course was for these ships to carry coal to the Indian Ocean, and this might be done for 15s. per ton if a good market for coal were created in that region. An alternative method, suggested by others, is not without interest. Coal could be carried, practically as ballast, by ships sailing to Alexandria; thence it would reach Cairo by river, and finally be transported by camel-back across the desert

to Suez. It was calculated that the total laying-down cost at that port would be about £3 per ton.

According to Lardner's estimate, by the Suez route, properly organised, Falmouth might be reached from Calcutta in something over fifty days, of which six would be taken up by the journey from Suez to Alexandria and thirty by that from Calcutta to Suez; this would represent a saving of half of the time occupied by the voyage round the Cape. There would be a similar saving in cost. He calculated that the First-Class passenger, instead of paying £120 for the trip in a sailing ship, could be carried to India for about £40. The saving would apply to over 3,000 passengers who used the Cape route annually.

While Lardner and others were writing and talking, a certain Thomas Waghorn, a person of considerable energy and resource, was occupied on behalf of the East India Company in making journeys by the Suez route, of which he had been one of the earliest pioneers. He had met, at first, the usual fate of the pioneer; he was laughed at, as a visionary, by stay-at-home "practical" people, while his suggestions were received by government officials with distinct coolness. None the less, he persevered, and in 1845 succeeded in delivering letters to Bombay in the extremely short time of thirty days.

The facts were too strong for the critics; by the early forties, a considerable traffic was developing by way of Egypt. The journey, however, was hardly likely to attract the mere tourist. The traffic seems to have been worked by an English company, with a monopoly. For the modest sum of £15, the traveller, on the 170 miles from Alexandria to Cairo, had the privilege of occupy-

ing a plank on the deck of a primitive river steamer, and of washing in the ship's bucket. A certain quantity of indifferent food was thrown in, without extra charge. Mohammed Ali, as a wise ruler, annexed the monopoly and greatly reduced the charges, apparently still leaving a margin of profit. The eighty-mile stretch from Cairo to Suez was even less comfortable; the travellers were packed, six or eight together, in a dogcart, at a fare of £12; though the alternative camel or donkey was relatively cheap, until the Transport Company cornered the market. An interesting comment on the situation is to be found in the fact that the British Consul at Cairo was, according to contemporary statements, both contractor for transport and agent for the East India Company and the P. and O. shipping company—a combination of functions not without parallel in our diplomatic history.

The growth of trade was steady, in spite of the difficulties of transport. According to a contemporary French estimate, the trade of the port of Suez, in 1856, amounted in value to £2·5 sterling, of which two-thirds was transit trade between Europe and Asia. In addition, a sum of many millions in silver, largely in the form of five-franc pieces, was forwarded by this route to India, while some 17,000 pilgrims and 5,000 European passengers passed through the port. The increase was very rapid at this time, owing to the establishment of a regular service by the P. and O. mailboats between Suez, India, and the Far East, and the completion, in 1857, of the desert railway from Cairo to Suez.

While this overland traffic was growing, one man with imagination and foresight was contending with stolid

and unintelligent conservatism, with the result that, in 1854, the Concession for the trans-isthmian canal was signed. With the history of the Canal as an engineering work, the difficulties encountered and overcome, the financial, political, and international questions involved, we are not here concerned. The inquisitive reader can easily satisfy himself from the official histories, the Parliamentary Papers, and the many contributions, good or otherwise, of journalists and pamphleteers. For our purpose, the only important question is that of the effect of the opening of the Canal to commercial traffic in 1869 on the character and direction of shipping and trade.

The effect of the cutting of the Canal, as measured in mere distance, was to shorten the voyage to Indian ports by four thousand miles, more or less, or over a fortnight's steaming for the fastest vessel of those days. For the Mediterranean ports of Europe, the gain was greater. The Canal, however, was merely a ditch, long and narrow. As an offset to the gain in distance, though a single ship, with a clear course, might effect the eighty-mile transit in twelve to fifteen hours, the conditions were far less favourable for a group. In the early seventies, transit was fairly rapid; but, as the tonnage using the Canal increased, so did the time lost in passing. Moreover, the Canal was available only in daylight; so that the average time of transit rose, by the year 1883, to nearly fifty hours, while this might be extended to three days if a ship grounded in the channel.

The Canal had already exceeded the expectations of its projectors and was too small for its work. This great increase of traffic, over fivefold between 1872 and 1882,

took place in spite of the fact that the Canal was distinctly an expensive luxury. The dues and tolls amounted to over ten francs per ton, and the Company claimed to calculate the taxable freight space on principles entirely favourable to itself. Even to-day, the Suez Canal net tonnage, on the basis of which the dues are levied, is considerably higher than the tonnage as calculated by the various maritime Powers whose ships use the Canal.

The delay and expense roused the shipowners and merchants, more particularly those who had doubted the possibility and denied the value of the project. There was the usual indignation meeting at the Cannon Street Hotel, and a scheme was mooted for a second canal, as a way out of the difficulty. The scheme came to nothing, but the ultimate result of the agitation and of a series of negotiations was seen in the adoption by the Company of a policy of steady improvement, together with a lowering of rates. The chief improvement of the moment was the lighting of the Canal, together with the authorisation, in 1887, of navigation by electric light, which increased greatly the capacity of the Canal by rendering possible the journey by night. Improvement in depth and width provided for larger steamers. A depth of 26 feet, in 1869, with a bottom width of 72 feet, had been increased, by 1908, to about 33 feet, allowing a ship's draught of 28 feet, with a bottom width of nearly 100 feet; while, by the end of 1914, a depth of about 36 feet was available through the greater part of the channel, and several ships with a draught of 30 feet actually traversed the Canal. In the meantime, the passing-places have been enlarged and increased, and, in the near future, the Canal should be of such width

throughout that the tie-up will be avoided. The completion of the scheme will more than double the capacity of the ditch and provide for the needs of shipping, of moderate size, for many years to come. By January, 1912, the rates had been lowered to 6·75 francs per ton, with a reduction of 2·50 per ton for ships passing through in ballast; while in January, 1913, the full rate was down to 6·25.* By this date, also, the average time of transit had fallen to a little over sixteen hours.

In 1882, some inquiring person in Parliament asked for information as to the effect of the Canal on British trade and shipping. The Board of Trade set out to investigate, though the data available were no more satisfactory then than at present. According to the estimate then worked out, of a total of about 2·0 tons of shipping entering our ports, in 1880, from the East and Australia, a little over forty per cent. came through the Canal; while of the 2·8 tons cleared, a little under forty per cent. used this route. Of the goods carried, about half our imports from, and rather less than half our exports to, India and China were viâ the Canal, while the proportion of imports from the Far East alone was considerably greater. The tea and coffee from India, with most of the cotton, took the shorter route; while jute, rice, and some of the cotton still came by the Cape. Australia was, naturally, less affected, only seventeen per cent. of our imports and less than two per cent. of our exports using the Canal. This proportion, however, was growing rapidly, since an independent estimate for 1887 assigns a third of the total Australian traffic to the Canal route.

* The rate was raised to 7·25 under the war conditions of 1916.

We thus have a rough measure of the diversion of traffic effected in the course of ten years. The diversion was not merely a matter of routes; it was intimately bound up with the substitution of steam for sail. The tonnage of sailing ships trading with the East showed a rapid decline in the seventies. This revolution, which was bound to come, was hastened by the fact that the Red Sea was hardly a possible route for the sailing ship owing to the prevailing winds.

So much for the shipping. The effect on trade and commercial organisation was even more widespread and important. Briefly, the Canal gave a strong impetus to the export of Indian produce to Europe, particularly to Mediterranean ports. Between 1870 and 1880, the direct trade with France, Italy, and Austria, especially on the side of exports of Indian products to these markets, showed a great increase, while that with the United Kingdom showed a relative decline. In the same period, the export of rice from India doubled, while the increase in wheat was even more marked, since the conditions of the Cape route were not favourable to its carriage. The export rose from a few thousand tons weight, in 1870, to nearly ·4 tons in 1881; and, though fluctuating greatly, reached more than double this total during the eighties. The great increase came after 1876, when the effect of the improvement in design of steamers and engines was making itself felt. Jute, oil-seeds, and tea show a similar movement; while, in the other direction, Russian petroleum found a ready market in India, the import rising rapidly and steadily to over fifty million gallons in 1890.

This increase in trade was partly conditioned by

internal changes and progress in India itself; but the rapid rate of growth was undoubtedly due in the main to improved means of transport and intercourse with Europe, while the internal development of India was greatly influenced by its greater accessibility to European capital and energy. The greater facility of transport was reflected in the marked fall in the European prices of special eastern products, a fall of from twenty-five to thirty-five per cent. between 1870 and 1884. The fall was seen also in Australian wool, though to a less degree.

The producer in India and the consumer in Europe benefited; but many British merchants and shipowners took a somewhat pessimistic view of the probable results of the new route on their special interests. The shortening of the journey necessarily involved the use of less tonnage to carry a given quantity of goods; but the rapid growth of the trade is to be set against this temporary disadvantage. A more serious problem was provided by the hastening of the substitution of steam for sail, and the consequent rapid decline in the capital value of sailing ships. The possessors of such capital naturally failed to appreciate the benefit accruing to the world in general at their special and individual expense. This, however, is one of the usual incidents to the introduction of improved mechanism in any industry. The transference to steam was inevitable, but the process was somewhat hurried by the special needs of the new route.

The merchants, too, were justly nervous as to their position. Rice, cotton, and silk, coming through the Canal for the markets of southern and central Europe, were not likely for long to crowd the London warehouses.

The ports of the Mediterranean gained at the expense of London, though not to the extent anticipated, the silk trade showing the most rapid change. The gain was increased later by the piercing of the Alps. The change, however, was gradual, since an old-established commercial centre possesses great power of resistance to any shifting of its traffic; and the United Kingdom still has a considerable re-export of Eastern commodities, both to western Europe and across the Atlantic. The entrance into Indian trade of a subsidised line of Austrian steamships from the Adriatic is an illustration, on the side of transport, of the advantages of the Canal to Mediterranean countries. French and Russian shipping have equally profited. On the side of trade, the growth of the oilseed business of Marseilles provides another illustration. In short, the effect of the Canal was to give a new lease of life to the trade and shipping of Mediterranean ports in general, much of it under the national flags; though the British flag still has some share, as we shall see later.

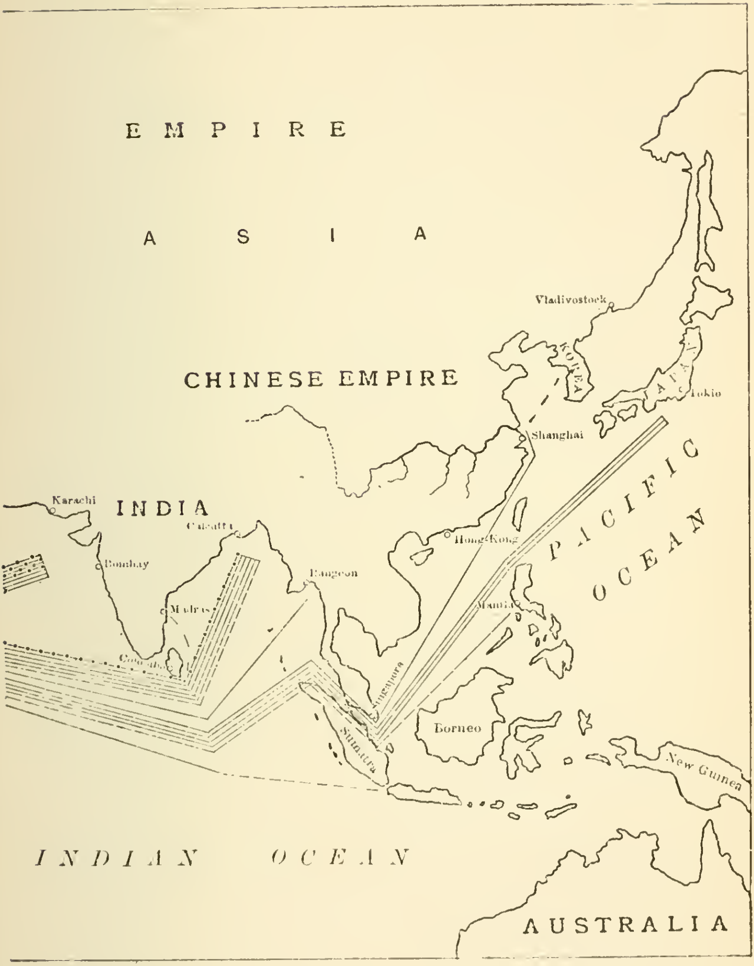
Let us look at the matter from the statistical point of view. In 1870–5, seventy-three per cent. of the traffic through the Canal was under the British flag; in 1901–5, the percentage was only sixty-two. In 1912, the British share was slightly higher, Germany being next with fifteen per cent., and then Holland with six. These figures are, however, somewhat misleading, if we consider the work done by the ships. A proportion of the total tonnage, varying from thirty per cent. for Holland to fifty per cent. for Austria-Hungary and France, is classified by the Canal Authorities as Mail-shipping, while only ten per cent. of the British ships traversing the Canal come under

this category. The mail vessel, whether subsidised or not, is less efficient as a carrier of cargo than the ordinary merchantman. Percentages also are easy to misinterpret. The actual total increase of British shipping between 1875 and 1905 was nearly 7·0 net tons, or fifty per cent. more than the increase of all other flags put together.

We will now return to our analysis of existing conditions, and try to grasp the importance of the Canal to British shipping and trade at the present time. As we are going to consider the cargoes carried, we must turn first to the Board of Trade returns which provide comparative information both as to ships and cargoes.

In 1912, nearly 2·8 net tons of British steam shipping cleared from ports of the United Kingdom, with cargo or in ballast, for the Red Sea, the Indian Ocean, and the Far East. The ships in ballast, about ·1 tons in all, may have been empty, or perhaps they carried foreign cargoes and touched at our ports; the statistics do not enable us to distinguish. To this total must be added over ·3 tons from New York to the East viâ the Canal. So we have already over 3·0 tons to trace in the Canal statistics. These statistics give a total movement, from north to south, of ships under the British flag, of 4·6 tons net register. This total of course includes the Australian and African trade; but, deducting ·55 for this, we still have 1·0 tons traversing the Canal but not carrying cargo direct from the United Kingdom or the United States to Far Eastern ports. A small portion may be accounted for by British ships arriving at the Canal with cargoes from Continental, especially Mediterranean, ports; the remainder, not far short of 1·0 tons, traversed the Canal

FIG. 4.—THE INDIAN OCEAN AND THE FAR EAST:



BRITISH STEAMSHIPS, OUTWARD.

in ballast. What is this mass of empty tonnage doing in this part of the World?

Once again we must turn to our coal figures. Egypt alone, in 1912, imported from the United Kingdom 3·0 tons weight of coal. About two-thirds of this was landed at Port Said, the greater part being for the bunkering of ships. Not far away, too, is Italy, after France the largest single market for British coal. So we can easily account for the presence of empty tonnage in the neighbourhood of the Canal; in fact, it has been largely employed in the working of the Canal route itself; but, instead of returning direct to our shores for more coal, it scatters in search of cargo either to the Eastern Mediterranean and the Black Sea or to the Indian Ocean. The latter course is favoured by the low dues on ships traversing the Canal in ballast, though the movement through the Canal in 1912 was abnormal owing to the adverse conditions in the Black Sea. Thus, the stream through the Canal is made up partly of ships carrying cargo from the United Kingdom to beyond Suez, partly of ships carrying American cargoes, and partly of ships in ballast which have for the most part already landed cargoes of coal at intermediate ports. We have now traced three distinct streams of shipping, either in ballast or carrying coal, from Europe, South Africa, and Australia, all converging on the Indian Ocean. Later we may find still another such stream.

Not all the coal is dropped on this side of Suez; a considerable, though decreasing, quantity, about ·75 tons weight in all, is carried beyond, mostly to Aden, Colombo, and Bombay. Small quantities also reach the Straits and the Far East. This mass of coal, large though it

seems, represents less than a seventh of the capacity of British ships traversing the Canal with cargo from the United Kingdom for the East. In fact, the coal trade south of Suez is insignificant compared to that in the neighbourhood of its northern end, and it tends to become steadily smaller with every development of alternative sources of supply in the Indian Ocean and the Pacific. In 1912–13, of a total of ·65 tons imported into India, mainly Bombay, only ·16 came from the United Kingdom, as compared with ·7 in 1890; the remainder was credited to South Africa, Australia, and Japan. Though the year was abnormal in the coal trade, the tendency is plain.

Let us now take our stand at Aden to see how far we can trace the branches of the stream of traffic passing that point. Deducting the Australian, South African, and local Red Sea traffic, we have left a round total of some 4·0 tons, of which only about three-fourths is actually carrying cargo. Deducting also the ships from America, and those in ballast, we find over 2·75 net tons of British ships carrying cargo through the Canal and bound for some region north of latitude 10° S. Nearly all these ships carry cargoes of British goods, though some may also carry Continental goods brought from North Sea ports or picked up in the Mediterranean *en route*. Our Board of Trade figures profess to give the final destination of the ships departing from our ports as marked by the last package of cargo landed; let us see what they can tell us. In round figures, they credit 2·0 tons to the Indian Ocean and the remaining ·7 to beyond Singapore. Of the Indian Ocean tonnage carrying cargo, we shall be sufficiently accurate if we assign ·1 tons each to Aden

and Ceylon, the same to Dutch Malaya, ·2 to Burma, and 1·4 to India proper. Nearly the whole of this last is to be credited to Bombay, with Karachi, and Bengal, since Madras is not a terminal region. Bengal has rather more than half the Indian total, Bombay rather less. By this rough division we gain some idea of the relative value for our manufactures of the various parts of the markets of the East, as measured by the quantity of shipping which they employ. We will try later to give it more precision. Singapore and the Straits have not much terminal traffic, though a large trade is carried in passing vessels. Three-quarters of the tonnage beyond this point has its terminus in Japan, not on the Asiatic mainland.

We are aiming at an idea of the work done by our ships, so we must return to the standpoint of the United Kingdom. For the Indian area, including the Straits and Malaya, there are heavy goods in quantity—iron, steel and machinery, coal, cement, salt, a vast mass of cottons, together with very many miscellaneous manufactures—enough, including the coal to Aden and Ceylon, to occupy nearly 3·5 tons of shipping space. Allowing for a certain quantity of goods for Ceylon and the Straits carried in ships bound for more distant regions, and taking account of the work of Dutch ships in Malaya, we arrive at a load-index of about ·8 for the Indian Ocean generally. The load-index for Rangoon is much lower than the average for the whole area, while Ceylon, on the other hand, seems to have ·35 m. tons of cargo for only ·11 tons of shipping. At first sight this is puzzling, since it gives a load-index of over 1·5, or fifty per cent. above our theoretical capacity; but the difficulty is easily solved. The

shipping cleared to Ceylon is sufficient to carry the ·24 tons weight of coal which Colombo imports, while the trade in miscellaneous goods is evidently carried on by some of the many ships calling *en route* to a more distant terminus, and therefore not credited in the statistics to Ceylon. Even with this correction, the load-index is over 1·0; but our estimate of capacity is only an average, and we must expect tramps, with a single cargo such as coal, to be loaded to the full. We shall meet again this problem of the loading of coal in connexion with the shipping of a far more important market for that commodity.

Let us now try to track out the shipping beyond Singapore. Of the ·7 tons, eighty per cent. has Japan for the terminus of its voyage, though the ships call at Chinese ports and so may carry some of the trade of the mainland. The goods carried amount to about 1·0 m. tons, rather more than half of this total going to Japan. In addition, we may credit these ships with much of the trade of the Straits and some of that of Ceylon. Estimating a grand total of 1·25 m. tons of cargo, we arrive at a load-index of nearly ·9. This figure suggests that the outward voyage is more profitable than that to the Indian Ocean as a whole; but the return voyage must not be forgotten, and we must take account, too, of the possibility of foreign competition in the carriage of British goods. In 1912, about ·15 tons of foreign shipping, almost entirely German, carried goods of some kind from ports of the United Kingdom to India and Ceylon. The quantity carried would depend largely on the agreements existing between the various shipping Conferences which control the outward

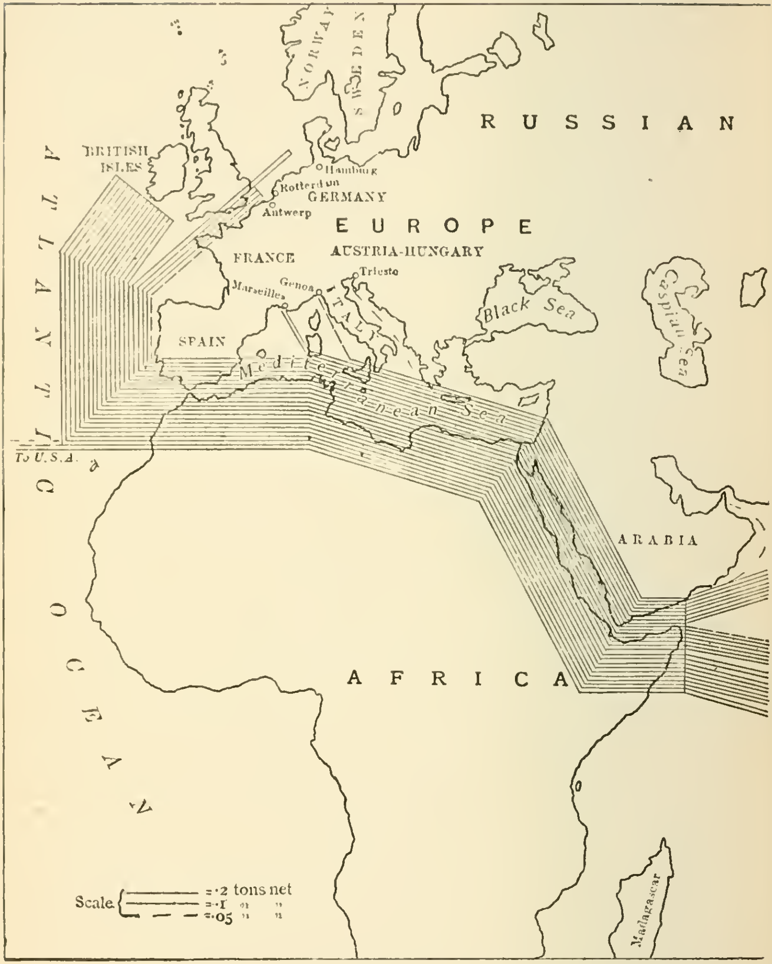
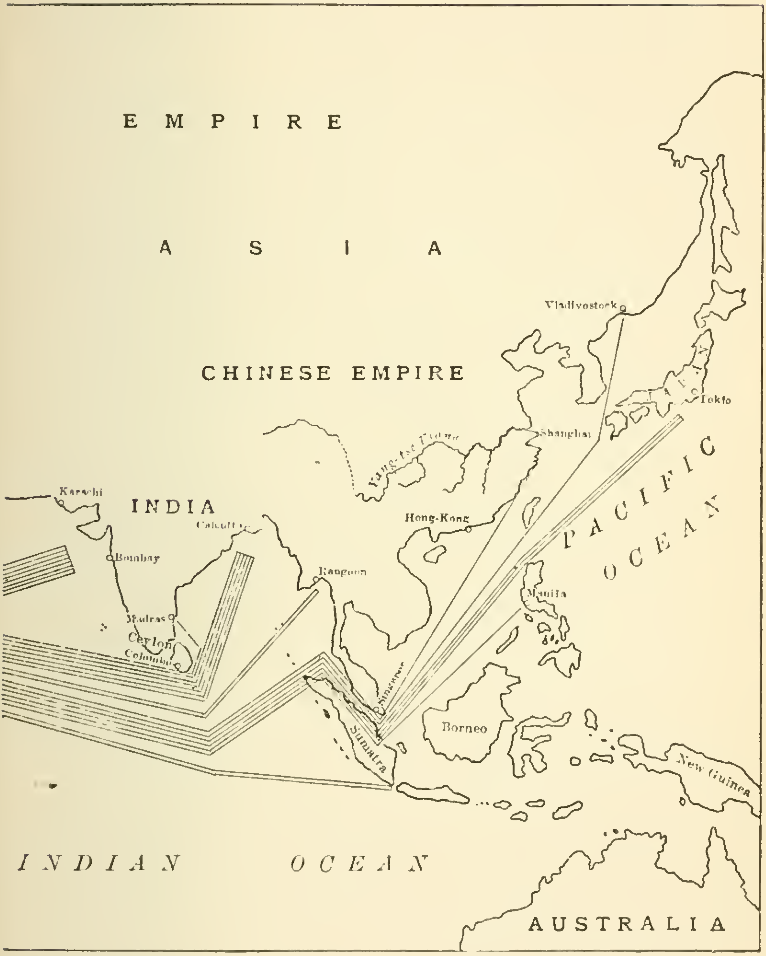


FIG. 5.—THE INDIAN OCEAN AND THE FAR EAST:



BRITISH STEAMSHIPS, HOMEWARD.

trade. If we spread the work over all ships, our Indian index is reduced to ·76. We have allowed already for the share of the Dutch ships in the trade of Malaya. In the Far Eastern trade, a larger proportion of foreign shipping was engaged, but, in this case, for the most part, under the Japanese flag. On the assumption that the Japanese tonnage carried its fair share of our exports, the index, for all ships, would be reduced to about ·7, rather lower than that for the Indian Ocean. As against the British cargoes carried by foreign ships may be set the large quantity of Continental goods carried in British ships. Even allowing for competition, the Far East shows a profitable outward traffic, while in India and Ceylon British ships have almost a monopoly of the carrying trade from the United Kingdom.

The return journey shows a very different picture. As against 4·0 tons of British shipping, of which nearly a quarter was in ballast, moving southwards through the Canal, to the Indian Ocean and the Far East, we find about 5·0 tons, nearly all with cargo, coming northwards. This includes some ·35 tons bound for North America; so that we are left with about 4·65 tons of shipping to carry goods from India and the East to Europe, as against 2·75 in the opposite direction. Not only does the outward ballast tonnage return with cargo, but nearly another million tons has been found from some source. A further subdivision is difficult, since much of this traffic does not come direct to the United Kingdom and so does not appear in our statistics in a recognisable shape. We must use estimates and check by the Indian figures, though, unfortunately, the Indian official year does not

correspond with the calendar year to which we are working. Comparing the various statistics, we arrive at the conclusion that a little more than ·75 tons is to be assigned to the region beyond Singapore, and the remainder, about 3·85, to the Indian Ocean. This compares with 2·0 tons on the outward voyage.

In the first place, whence comes the surplus of a million and three quarter tons? We have noted already the stream of ships in ballast through the Canal, and shall be fairly safe in assuming that this is not destined for countries beyond Singapore. More than half the remainder may be credited to the southern Indian Ocean—to the movement of ships, from the South African area, in ballast or carrying coal to Colombo, Bombay, and Karachi. For the rest we must look to the ships which bring cargoes, largely coal, from Australia to Malaya and India, but do not return to their starting-point. Perhaps, too, we may include a certain amount of tonnage carrying coal from Japan to the Straits for local use. So that, even beyond Singapore, the movement of coal is not without importance for the organisation of the main route to Europe.

The whole mass of tonnage is seeking cargo in India, Burma, or Malaya, and that portion which is not recorded as passing southward through the Canal must have reached the Indian Ocean, either from Europe or from America, by way of the Cape of Good Hope. The proportion of the various streams of shipping thus converging on the Indian Ocean may vary from year to year, and we have noted above that the movement in ballast through the Canal was unusually large in 1912; but their general stability

depends on the character of the products of the southern Hemisphere, together with the distribution of coalfields in relation to the needs of industry and transport beyond Suez. We are therefore justified in treating the movement of shipping to which these conditions give rise as a fairly permanent element in the organisation of the route to the East.

The division of tonnage and cargoes between the different parts of the Indian Ocean is a matter of considerable difficulty. First let us take Malaya. The Canal statistics recognise ·25 tons under the British flag as coming from the Dutch Indies; of this, practically the whole enters the ports of the United Kingdom carrying cargo. The cargo amounts to over ·45 m. tons, nearly half being sugar from Java and much of the remainder petroleum from the other Dutch Possessions. The load-index is ·9, and the ships are evidently well filled, while the competition of foreign ships is very slight. Ceylon may be omitted, as its moderate though valuable trade is carried by passing ships of the liner type which do not necessarily carry other Indian cargoes. Omitting the minor areas, we are left with some 3·5 tons of British shipping available for carrying the products of India and Burma to Europe as a whole. Of this, about two-thirds carries cargo to the United Kingdom; the rest serves the ports and markets of the Continent. The goods carried to the United Kingdom are upwards of 4·75 m. tons, including vast quantities of grain, seeds, jute, cotton, ores, with the many minor products of a great agricultural and pastoral area. The only commodity of high value in proportion to its bulk, which is exported in any

considerable quantity, is tea; so that the region is a natural market for the tramp steamer. The load-index is nearly 1·0, and there is practically no deduction to be made for foreign competition. The Indian Ocean, as a whole, thus shows an actual loading for the homeward voyage of about ninety-eight per cent. of the theoretical capacity which we have assumed for all merchant ships on all the long routes for a year's work, and it is easy to understand why this area attracts tonnage from every direction. The movement of passengers is of small importance compared to that of goods; in 1912 it amounted to about 10,000 outwards and rather under 9,000 homewards from India and Ceylon.

The Indian trade is so vast that it is worth while to push our analysis further if possible. We found that, on the outward journey, the Calcutta and Bombay areas took most of the tonnage with cargoes, Calcutta having somewhat the larger share, while Burma was third, but a long way behind. On the return voyage, the entries from Bengal to the ports of the United Kingdom, with cargo, are about ·1 tons more than the clearances, while those from Bombay are ·5 more. The figures suggest that Bombay and Karachi provide proportionately more return cargo than Calcutta, and that this fact determines the direction of the outward stream of ballast tonnage. Empty ships, on the Red Sea route, would naturally seek the nearest source of cargoes, while the market for South African coal is mainly in Bombay, on the west side of the Peninsula, and in Ceylon. As a matter of fact, Indian statistics show a much larger entry in ballast at Bombay and Karachi than at Calcutta, while the total

clearances of British ships with cargo to all destinations, in 1912–13, were from Calcutta about 1·5 tons and from Bombay and Karachi 2·1 tons. The figures represent a difference in carrying capacity of well over 1·0 m. tons of cargo, and much of this tonnage is bound for the United Kingdom. The Canal figures, for 1912, give the total weight of traffic northwards, from Bombay and Karachi in all ships, as 2·9 tons, nearly half being wheat from Karachi and the rest mainly oil-seeds, manganese, wheat, and cotton from Bombay; while the jute, oil-seeds, wheat, rice, and minor products from Calcutta amount only to about 1·75 tons, jute accounting for more than half. Practically all the cargo from Burma is rice, nearly equal in weight to the wheat from Karachi.

We have accounted for nearly three-quarters of the British tonnage coming northward to Europe through the Canal from the Indian area and find that its destination is the United Kingdom; what of the remainder? The greater part is bound for Antwerp, Amsterdam, Rotterdam, Hamburg, and the ports of France; in short, the cargoes are destined for western industrial Europe. The tonnage so used is about equal to that carrying coal to the Indian Ocean, or arriving there in ballast after carrying coal for part of the journey; so that, from one point of view, we may consider that the coal of the United Kingdom is employed as outward cargo to cheapen return freights on foodstuffs and raw material not merely for the United Kingdom, which takes part only of the exported produce of India, but also for the benefit of Continental Europe. Rotterdam and Antwerp are largely German ports, and much of this return traffic to the Con-

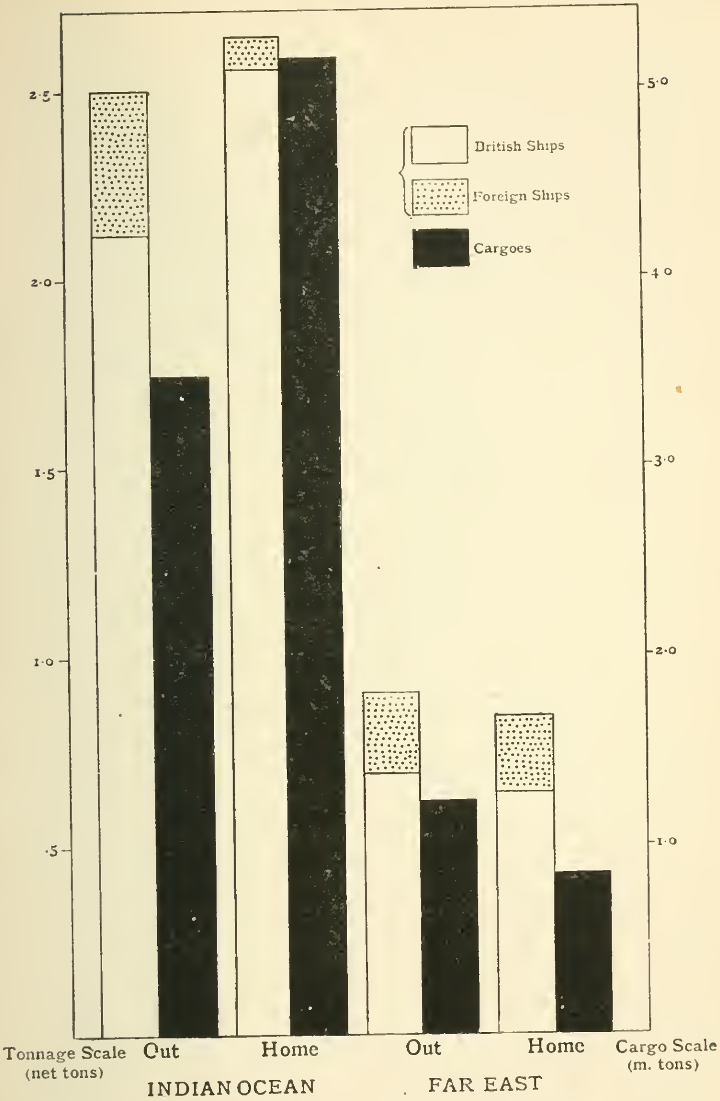


FIG. 6.—THE INDIAN OCEAN AND THE FAR EAST.
All ships with cargoes, outward and homeward.

tinent is ultimately for the benefit of Germany, since that country buys largely of Indian jute, cotton, rice, seeds, and hides.

We have now analysed briefly the traffic of the Indian Ocean. The remaining branch of the great northward stream is that from beyond Singapore. What kind of employment is offered to these ships? Of the ·75 tons coming northward through the Canal, only about ·65 carry cargo for the United Kingdom; the remainder again for the most part is to be looked for in the ports on the other side of the North Sea. The cargo from the Far East to the United Kingdom is of about ·7 m. tons, of which half consists of beans, especially the recently introduced soya bean from the Manchurian area, largely shipped from Vladivostok. Hemp from the Philippines bulks largely in the remaining cargoes. Adding perhaps ·15 tons picked up in Malaya, we find the ships loaded only to two-thirds of their theoretical capacity, the index being ·65. Even this is too high as an estimate, since we must allow for the competition of some ·2 tons of shipping, largely Japanese, with some German, working on this route to British ports. Corrected, as before, for foreign competition, the index becomes ·5, though, for the whole voyage, it may be raised again by cargoes picked up in Ceylon. Apart from the bean, Japan and China have little to send to us, and, whether we correct or not, the contrast between the outward and homeward voyages is sufficiently marked. In the light of these figures we can understand why a tramp steamer should come southward from the coast of Asia in ballast, or carrying coal from Japan, and seeking cargoes for

Europe in Malaya and the Indian Ocean. We may also appreciate the fact that the homeward trade from this area, before the day of the soya bean, provides one of the earliest illustrations of agreements among shipowners to prevent unprofitable competition among a large number of ships for a small quantity of goods. The commercial importance of the great land-mass of eastern Asia has been greatly exaggerated from early times. The chief trade, to-day, is with the peninsulas and islands; and, apart from developments in Manchuria, Japan, and the Philippines, it is not a very serious item in our calculations of the employment of shipping. Out of a total of from 12·0 m. tons to 13·0 m. tons of foodstuffs and raw materials coming northward through the Canal in 1912, three-quarters can be credited to the Indian Ocean, with Malaya, about a sixth to regions beyond Singapore, and the remainder to Australasia and East Africa.

We have now a measure of the value of the Suez Canal to the Empire expressed not merely in distances, or the movement of shipping, but in the combined movement of shipping and goods. We are justified, in view of the figures above, broad estimates though they may be, in the statement that the region of the Indian Ocean is not only the central fact in our Eastern trade but is also essentially related to the working of the traffic both round the Cape and beyond Singapore. At the same time, though the United Kingdom has a large share of the trade and a still larger share of the transport business, Indian products also find their market in Continental Europe. British ships have a share in this traffic; so that, though the

Canal is of great importance to the trade of the United Kingdom, it is of even greater importance to the trade of India and to British shipping, which has almost a monopoly of the carriage to the United Kingdom and a very large share in that to Continental Europe.

The Indian Ocean differs from the regions so far considered in that it provides, on a vast scale, and in great variety, the bulky raw materials and foodstuffs needed for the support of the industrial areas of Europe. In proportion to the total movement of traffic, the passenger element is of minor importance, while most of the commodities exported are naturally fitted for handling by tramp steamers. Though the consumption of European goods in India is large, the mass of the traffic is homeward, from the Indian Ocean to Europe, and, in consequence, the problem of outward cargoes is found on a large scale. It is partly solved by the method of the indirect voyage and the transport of coal to India from the southern Hemisphere; but this movement is not large and depends for its permanence on the extent to which native Indian supplies of fuel can be developed. In default of coal, many ships must arrive in ballast, and the Indian Ocean is a great collecting area for empty ships seeking employment. The real importance of coal in the trade of the region lies not so much in the direct import as in the export from the United Kingdom to the Mediterranean which gives employment to shipping on part of the route. It is a special solution of the problem of balance of cargoes.

The importance of the Indian area is great, as measured by the sum total of its export and import of commodities,

but the trade per head of the population is small. A slight increase per head would add enormously to the total volume, and the conditions for such increase lie particularly in India proper. Comparatively slight changes in methods of production, with moderate improvements in internal transport, when applied to an area of vast productive capacity and population can produce effects of great moment in the matter of overseas commerce and the employment of shipping. The progress of Indian trade, during the past generation, has been rapid; its future may perhaps transcend the possibilities contemplated by the most optimistic supporters of the scheme for the Suez Canal.

CHAPTER IV

SUEZ AND PANAMA

We have discussed the Suez Canal as the factor controlling the routes to the Indian Ocean, the Far East, and in part those to Australasia. What of the future? Will the Panama Canal, in full working, divert much of the traffic or affect this control seriously? Must we re-arrange our routes, or rather the quantity of shipping moving along them? If we must, who will profit, who will lose? Once again we must beware of hasty generalisation in terms of mere distance; we must remember that the ship is a machine, carrying goods and passengers and working for a profit. We must examine the map carefully, but with no less care consider products and markets.

The map shows the line of longitude 180° E. or W. of Greenwich passing through the extreme north-east corner of Asia, the Aleutian Islands, and Fiji, and just missing the north-east corner of New Zealand; in other words, as a matter of longitude, the whole of the region which we have discussed lies nearer to the United Kingdom by the east than by the west. The actual routes, owing to the lie of the land, are more devious and therefore longer by the east; so that we must re-arrange our ideas in terms of the approximate distance steamed. We

must deal with actual routes rather than mathematical lines.

In actual steaming distance, Sydney is about 150 nautical miles nearer to Liverpool by Suez and Colombo and the ports of southern Australia than by Panama and Tahiti; that is, the true equidistant line, in the southern Hemisphere, instead of lying just east of New Zealand, is near the coast of eastern Australia. On a voyage of over 12,000 miles we may ignore a few score miles and for all practical purposes consider the coast between Sydney and Brisbane as on the margin of indifference for the two alternative routes from the United Kingdom. The choice of route is likely to be decided by considerations other than distance, such as length of voyage between coaling-stations, the price of coal, availability of cargo, weather—all factors dependent ultimately on geographical conditions. South and West Australia are evidently nearer to Liverpool by the Suez route, while New Zealand is about 1,000 miles nearer by way of Panama and Tahiti, and still nearer by the most direct route across the Pacific. It is possible that one route may be adopted on the outward and another on the homeward voyage, as in the case of certain of the New Zealand lines at present; but this would be determined by the special conditions of the trade. We shall return to this point later, but first let us complete our survey by considering the northern Pacific.

Yokohama is, as we have seen, the terminus of the traffic to the Far East, and Yokohama lies slightly west of longitude 140° E. In spite of the detour round southern Asia, Yokohama is about 700 miles nearer to Liverpool

by Suez than by Panama, the latter route being rather over 12,000 miles in length; while the voyage to Hongkong or Manila is over 4,000 miles shorter by Suez. It is clear that the effect of the Panama Canal on the traffic of the Asiatic region to the south of Hongkong is hardly worth consideration, at any rate from the point of view of western Europe. There is, however, another point of view. We must look again at the streams of traffic from the eastern coast of North America round the Cape to Australia and the Indian Ocean and through the Suez Canal to the Indian Ocean and the Far East. Sydney is over 3,500 miles nearer to New York by way of Panama and Tahiti than by way of St. Vincent and the Cape; while Wellington is some 5,000 miles nearer by Panama than by the Cape, and 2,500 nearer than by the Straits of Magellan. Thus, eastern North America gains greatly in its intercourse with Australasia. The routes by the Cape and by Panama are alike in that each has only one region of call for intermediate cargo and each traverses wide expanses of ocean lacking in supplies of coal.

Conditions in the northern Pacific are less simple. Hongkong is roughly equidistant from New York by Panama, San Francisco, and Yokohama, or by Suez and Singapore. The same is true of Manila. The line of indifference for New York thus lies between Hongkong and Manila; all regions north of that line are nearer to New York by way of Panama. For ports between New York and New Orleans, which are passed on the journey southward from the former, the gain is evidently greater, and the line of indifference approaches Singapore. In short, the effect of the new canal is to bring the eastern

seaboard of the United States much nearer to central and northern China and to Japan, but not to change its relations with the Indian Ocean. The surplus of tonnage, however, which we noted beyond Singapore, will now have an alternative course homeward by way of western North America, so that the stream of traffic northward through the Suez Canal may be to some extent affected. There are, also, evident possibilities of a system of voyages right round the World in either direction.

To sum up, except in the case of New Zealand, the new canal, in the matter of shortening distances, is not likely to affect in any marked degree the shipping relations between western Europe and eastern Asia or Australasia. The most important change is in the relative position of the eastern seaboard of North America. This is a change of considerable moment to us, since it is the eastern manufacturing region of the United States which competes in exports with the manufacturing regions of western Europe. So we will now compare the two regions, keeping for the moment to the consideration of mere steaming distances.

Let us regard the stream of ships which we have noted before as crossing the Atlantic from the New York area and rounding the Cape on the way to Australia. To reach Sydney, with calls at Adelaide and Melbourne, these ships must steam 1,500 miles farther than those starting from Liverpool and using the Suez Canal; in fact, the Suez route is practically as short as that by the Cape even for New York. The Panama Canal has reversed this position. The distance is now 2,400 miles in favour of New York, or a total gain to that port of nearly

4,000 miles, or over a fortnight's steaming for a ten-knot cargo boat.

In comparing the two routes, the Cape and Panama, we must not forget to deduct the Panama Canal dues from the amount saved on the voyage through the reduced steaming distance. This would amount, perhaps, to the cost of running the steamer for ten to twelve days. The deduction for Suez Canal dues is about the same. None the less, the gain by the new route remains considerable. Adelaide is now rather nearer to New York than to Liverpool, but we may take it as marking our point of indifference for ships coming by the east or the west, from the two competing ports. Australia, east of this point, is now nearer to New York than to Liverpool; whereas, formerly, the whole of Australia was 1,500 miles nearer to Liverpool, and ships from both sides of the North Atlantic approached Australia from the west.

The case of New Zealand is more complicated. The voyage from Liverpool to Wellington, eastward, is about 13,000 miles; the Panama Canal shortens this to about 11,500, or rather less if the steamer does not touch at Tahiti; but here again we must not forget to correct for the Canal dues. On the other hand, New York to Wellington, by Panama and Tahiti, is under 9,000 miles; so that, on the shortest route, New York has an advantage of 2,500 miles, practically the breadth of the Atlantic. It is clear that, in the markets of eastern Australia and New Zealand, the new canal gives a decided advantage to the United States, as estimated simply in terms of distance, in its competition with the manufactures of western Europe.

Let us turn now to the northern Pacific. In its inter-

course with eastern Asia, the eastern United States, under the old system, was at a disadvantage, as compared with Europe, measured by somewhat less than the breadth of the North Atlantic. Hence the transit trade through the great exchange-ports of Europe. Shanghai is now about equidistant from New York by Panama and Liverpool by Suez; that is, the point of equality for the two competing ports lies in the neighbourhood of the mouth of the Yangtse. Yokohama is now nearer to New York than to Liverpool, and still nearer to the cotton-ports of the United States. Hongkong is, as we have seen, equidistant from New York by either route, while south of this the Suez route is the shorter even for New York. Thus, the eastern seaboard of North America is now on an equality with western Europe as regards its intercourse with the mainland of eastern Asia, while, in the case of Japan, it has a slight advantage. As the distance relations between New York and the Indian Ocean have not been affected, the conditions of competition in the export trade remain practically the same.

So far we have considered the problem of the Canals merely in terms of distance—a vital but not the only factor involved in the determination of the movement of shipping. Before dealing with the other factors, we must express our routes not only in figures but as actual lines of movement on the Globe; in other words, we must have the complete geographical surroundings before examining the economics of the question. The routes from Panama cross the great waste of the Pacific, and have therefore a simplicity which we do not find in those skirting the great land-mass of the Old World.

Four Great Circles provide the key to the understanding of the steamer lanes of the Pacific. From New Zealand to the Horn, the shortest route, just as that from the Cape to Australia, would carry the ship too far south, into dangerous waters. The ordinary course follows in part a line of latitude and in part a Great Circle. There is practically no land in the Pacific on this route, and the first calling-point for the ship is Montevideo; here coal, not cargo, is the determining fact, since South America, as we shall see later, is already provided with more than enough tonnage for its exports to Europe. This route, owing to conditions of wind and weather, and to the absence of intermediate cargoes, is essentially a return route for fully loaded ships.

More important, perhaps, in the future, is the Great Circle route from Wellington or Auckland to Panama. This passes close to the Galapagos Islands, and, far out in the southern Pacific, the little French island of Rapa. This island has been suggested as a possible coaling-point and alternative to Tahiti, which lies off the course to the northward.

Next there are the connexions between the North and South Pacific. The Great Circle from Vancouver to Fiji passes through the Sandwich Islands; and at Fiji the route branches off to Auckland or Sydney. This is the usual route, though the shortest course to Sydney from Vancouver would carry the ship, westward of Fiji, through the New Hebrides. The route from San Francisco to New Zealand differs little from the Vancouver route, and would pass near to Samoa; but Tahiti, in the Society Islands, slightly to the eastward, provides an alternative. Tahiti,

moreover, as we have noted, is not far from the Great Circle routes from Sydney and Auckland to Panama. So we find that the scattered islands of the Pacific, which we commonly neglect in our Geography, have considerable importance as points-of-call on the trans-Pacific routes connecting North America with Australasia. The Panama route is a new and disturbing element.

The route crossing the North Pacific, like that to the Horn, is not, in its shortest form, affected by the attraction of islands. It is, perhaps, destined to be the most important of all, and must be examined with some care. If we trace out on a globe the Great Circle from Panama to Yokohama, we may be surprised to discover that it crosses the Isthmus northward, to the neighbourhood of Colon on the Caribbean. We may follow it across that sea to Texas, and then to a point near the northern boundary of the State of Oregon, where it again strikes the Pacific. From this point the Circle sweeps round by the Aleutian Islands and finally approaches Yokohama from the north-east, though Yokohama lies slightly south of San Francisco in latitude. Thus, the shortest route between Panama and Yokohama, which lie both on the same Ocean, is partly by land. The actual route is by way of San Francisco, following the American coast and passing near Salina Cruz, the terminus of the important Tehuantepec railway. We will therefore transfer our attention to San Francisco.

The shortest route from San Francisco to Japan is north-west, joining the Great Circle from Vancouver in the near neighbourhood of the Aleutian Islands; but, especially in winter, the somewhat longer voyage, south-west from

San Francisco and then along a line of latitude, is preferred, since the northern course carries the ship into the teeth of the Westerlies. The course from Vancouver is practically part of the Circle from Panama to Yokohama. Our charts show the outward as rather farther north than the homeward course, and a slight difference between winter and summer; the maps showing ocean currents and the direction and strength of the winds in the neighbourhood of the islands at the two seasons may perhaps suggest an explanation.

If we continue our Great Circle past Yokohama, we find that it skirts the coasts of Asia and brings us ultimately to a point between Hongkong and Manila. Thus, the shortest way across the Pacific is to go round, as our distance figures have already shown. As a matter of fact, Manila is about the same distance from Panama either by way of San Francisco and Yokohama or by way of Honolulu and Guam, that is, across the breadth of the Pacific. This seems to contradict our previous statement. The explanation lies in the fact that the course by San Francisco is not a true Great Circle, and therefore not the shortest possible. The difference between the various routes is not more than 500 miles, so that other conditions are likely to determine the choice. Cargo ships from New York are likely to adopt the round voyage —Panama, San Francisco, Yokohama, Shanghai, Hongkong, Manila—owing to the great advantage of calling at these ports *en route*, since the only considerable quantity of cargo on the southern route is sugar from Hawaii, on the return voyage to the United States. We must remember that Manila, in relation to New York, is on the

line of indifference for the Suez and Panama routes; so that considerations of coal and cargo are all-important. We have noted already that eastern Asia is not a source of very heavy cargoes, so it is possible that ships will go out by Panama, with cargoes from eastern North America, but return through the Indian Ocean and the Suez Canal, picking up on the way raw materials and foodstuffs for Europe.

We are brought once again to the problem of competition between western Europe and eastern North America, in relation to the routes sketched above. We must expect to find that shipping which now uses the Cape route from the New York area to Australasia will prefer that by Panama. The latter route will suffer the drawback of the absence of South Africa as a calling-point; but the saving in distance, and therefore in expense, is more than enough to offset this loss. These ships are carrying American goods to Australasia, and the cost of carriage, and therefore the selling-price, ought to be reduced. The extent of such reduction depends partly on the weight of the Panama Canal dues, together with the cost of coal for the whole voyage. There will be American coal at the start, and again at Colon, which will thus be to some degree the equivalent of Port Said. There will be coal, American or Australian, deposited on one of the many islands of the Pacific; but the Pacific can have no Durban. Any reduction on the cost of carriage will affect competition in the Australasian markets. Some of the American goods exported to this region, such as kerosene, timber, tinned fish, do not compete with the products of the United Kingdom; but at least half, such as iron and steel, machinery, leather

and rubber goods, textiles, and miscellaneous manufactures, do so compete. A reduction of freight rates should tend to increase the advantage of American goods in this competition. At present, some American goods are transshipped in our ports; this trade is likely to cease, and the process may even be reversed, since there is a vast quantity of empty tonnage always crossing the Atlantic from east to west and available for the carriage of goods to New York.

On the return journey, the economic conditions are somewhat different. Australian imports from eastern United States are about five times the exports to that region in value, and the difference in quantity is even greater. We find in these exports fair quantities of copper ore, hides, and wool, but not enough to employ all the ships on the return journey, even if all the wool were sent direct instead of through London. The saving in distance will not alter the essential conditions of exchange. Ships outward-bound from New York to Australia may approach from the east instead of the west; but, in default of direct return cargoes to the United States, they must adopt the round about voyage, either through the Indian Ocean or by the west coast of South America. In the former case, they will probably load goods for Europe, as at present, and cross the Atlantic in ballast. The trade of eastern Canada with Australia does not seem to offer compensation for the want of balance with the United States, since the imports into Australia from Canada, though small, are yet seven or eight times the exports in value.

We have still to consider the possibilities of New Zea-

land, which lies on the new route from the United States to Australia and therefore can be worked in conjunction with it. The imports into New Zealand from the United States are more than three times the exports to that country in value, while about four-fifths of these imports compete with similar goods from the United Kingdom. The return trade in wool, kauri gum, and skins, is not sufficient to employ the available ships, and these may load for Europe, or seek other sources of return cargo in the islands of the Pacific or on the west coast of South America. The trade is mainly in British ships, and, as we might expect, the direct entries from the United States by far exceed the clearances.

We may see, then, a shifting of the stream of outward traffic between North America and Australia from the Atlantic to the Pacific; we may have to add a new line of traffic from western Europe to New Zealand, by way of Panama, with a return partly by Panama instead of by the Horn; there may be also an increase of the indirect return traffic to the New York area by the west coast of South America, at the expense of the Indian Ocean and Suez Canal route; but the mass of the movement between Europe and Australasia is not likely to be affected by the new canal to any marked extent. In the northern Pacific we may perhaps anticipate more important changes.

We began our survey of the effects of the new canal by a comparison of distances, as measured on the Globe; we are now in a position to realise, to some extent, the many conditions which may modify conclusions based on the argument from mere distance. The problem, simple

at first sight, grows in complication and difficulty with every closer approach to concrete facts. The geography which avoids the concrete, and is content with generalisations, stops short of its full and proper development, and is but an unsatisfactory instrument of investigation.

CHAPTER V

NORTH AND SOUTH AMERICA

We will now turn our eyes from East to West, from the Indian Ocean and the broad Pacific to the narrow Atlantic. Here we shall find not only the greatest movement of shipping but also the most marked contrast between the conditions of the outward and homeward voyages. We must remember that on the west side of the North Atlantic both industry and agriculture are well represented, while the Atlantic regions of Central and South America are agricultural or pastoral and producers of raw materials.

On a large scale, from the point of view of the organisation of shipping, the Atlantic is one and indivisible, just as, on a smaller scale, the North Sea and the Channel. The full meaning of this statement will appear later. Let us begin with the simple facts and figures. In 1912, over 7·0 tons of steamships under the British flag cleared with cargo from ports in the United Kingdom for the eastern and southern coasts of the United States, together with eastern Canada and Newfoundland. To this tonnage moving westward with cargo must be added over 2·0 tons in ballast. New York, with Boston and Philadelphia, receives eighty per cent. of the cargo and passenger traffic, while Galveston, New Orleans, and the

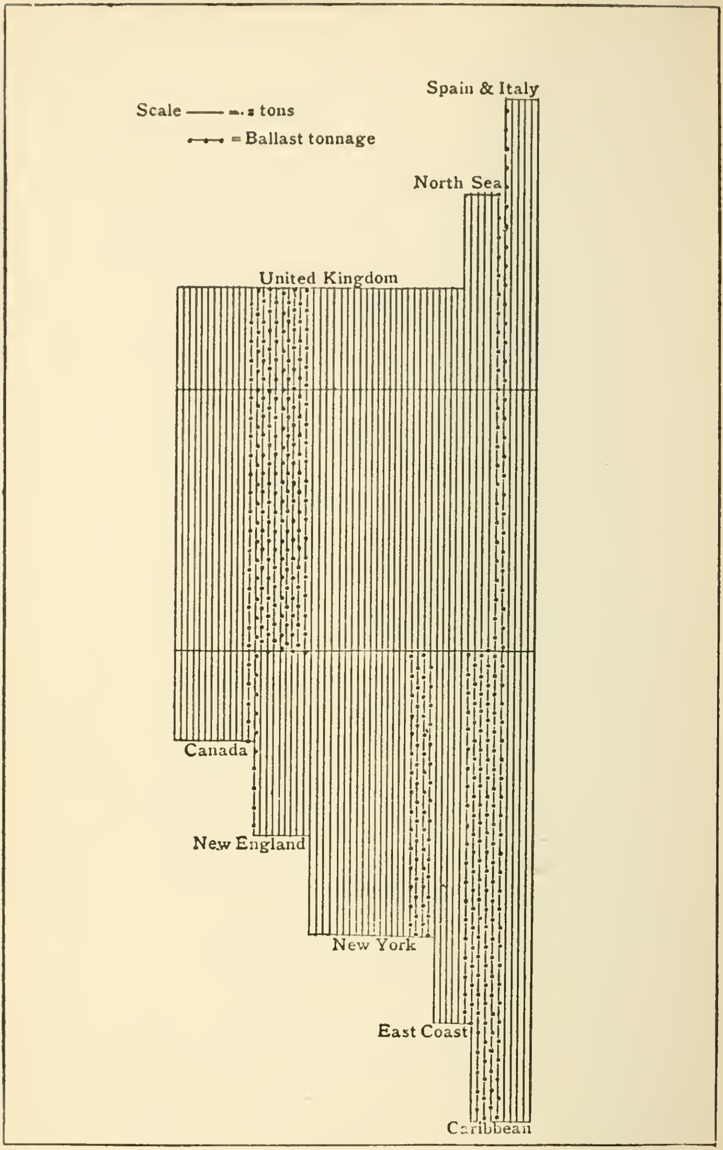


FIG. 7.—NORTH ATLANTIC.
British steamships, outward.

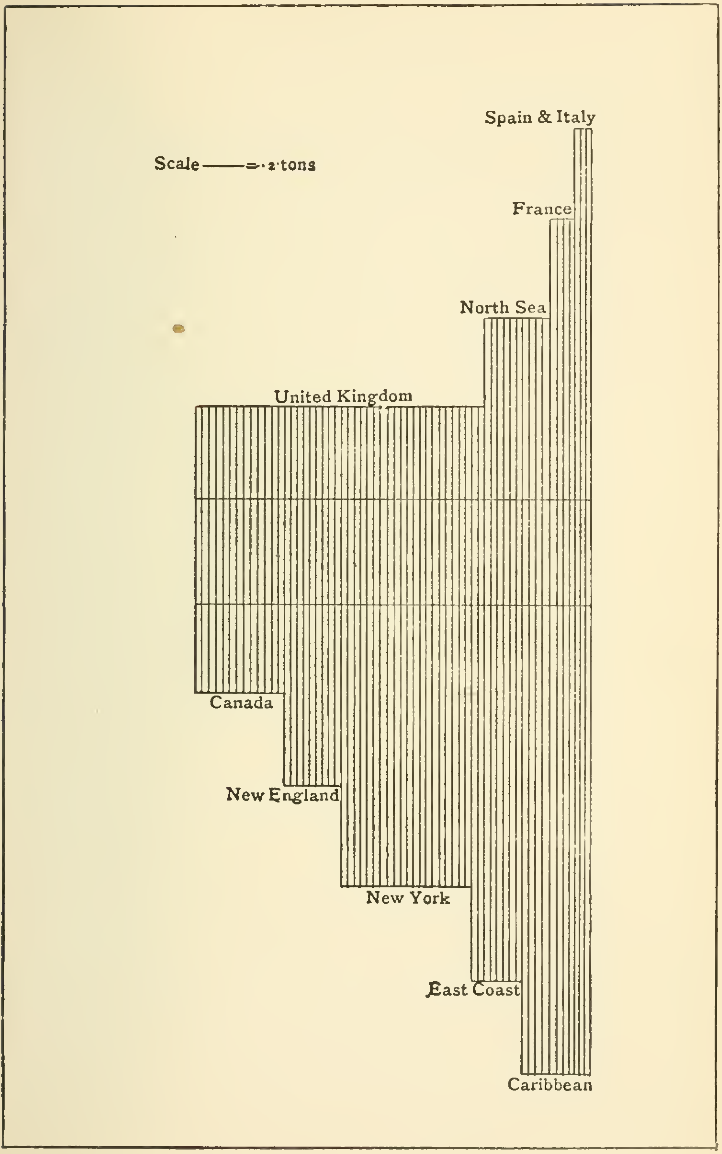


FIG. 8.—NORTH ATLANTIC.
British steamships, homeward.

Gulf ports are the destination of fifty per cent. of the tonnage in ballast.

This is far from representing the total activity of British shipping in the North Atlantic, since we must take account of ships carrying cargo of some kind from Continental ports to the United States. The quantity is difficult to estimate, especially as the American statistics are made up for the year ending June 30th, while ships may appear in our own tables as cleared from ports of the United Kingdom, though they actually started from the Continent. The total movement of British shipping from Continental ports may be estimated at not far short of 2·0 tons, of which half is from the Mediterranean and the Spanish Peninsula. With small additions for Canada, we may estimate a total westward stream of about 11·0 tons with cargo and in ballast. The tonnage entered at our ports, nearly all carrying cargo, is 8·9, and to this must be added over 3·0 tons bound for the Continent with cargo; so that about a million tons return to Europe which did not leave direct for North America, and the excess of return tonnage is not to the British Isles but to the mainland. Allowing for the ships outward-bound in ballast, we find over 3·0 tons engaged in transporting goods to Europe from North America which could find no cargoes in the opposite direction. The figures are subject to considerable errors, but they are borne out by the United States statistics for 1911–12. These record an entry of British ships from Europe of 7·0 with cargo and 1·7 in ballast, as against a clearance, all with cargo, of 9·7. We shall find further justification for the figures when we consider the import and export trade,

Let us now examine the figures for Continental Europe more closely. The countries which show, in their relations with North America, a much larger inward than outward movement of tonnage with cargo are Germany, the Netherlands, France, and Italy. The reason is clear; these all depend on America for large quantities of foodstuffs, raw materials, or special manufactures, while the United States, owing to its own industrial resources, aided by a high tariff, takes in return comparatively small quantities of European manufactures. It is to this double character of American economic organisation that the peculiar character of the shipping movement of the North Atlantic is mainly due. North America has a surplus of foodstuffs and raw materials, in addition to her manufactures; Continental Europe has for the most part a surplus only of manufactures, which do not occupy so much tonnage space. Hence the smaller outward clearances of shipping with cargo, and the correlative fact that, from the countries mentioned, as also from the United Kingdom, there are large clearances westward in ballast. The trade of Canada, where the conditions of exchange are rather different, is not large enough to affect seriously the general balance in the North Atlantic.

There are two notable exceptions to the rule as to the exchange relations of the United States with European countries. About ·5 tons of British steamships entered the United States, in 1911–12, from Norway and Spain, mainly the latter, while hardly any British ships cleared direct to those countries. The American export trade is not very large in bulk and seems to be handled in part by

foreign ships, in part by indirect shipments by way of the great European entrepôt ports. What is the reason for this exception? It lies in the presence in these countries of raw materials necessary for American industries—the wood-pulp and iron of Scandinavia, and, on a far larger scale, the copper, iron, and sulphur ores of Spain, which provide full loads for many ships. The exception merely serves to emphasise the general rule that North America has a far greater volume of goods to send to Europe than it receives. We can give more precision to this statement by an examination of the statistics of the United Kingdom, which will tell us broadly what goods are carried by the ships in the two opposite directions.

The export of British products to the United States may be estimated at 1·5 m. tons, over half consisting of potatoes, salt, clay, and minor raw materials, and the remainder being miscellaneous manufactures. To this, however, must be added at least another ·5 tons, consisting of such goods as wool, cotton, rubber, tea, and the many minor tropical and subtropical products collected in our markets. The load-index, corrected for foreign ships, works out at rather less than ·2, so that the total mass of shipping is loaded only to a fifth of the theoretical capacity which we have assumed. It is true that we must make an enormous deduction from the available tonnage for the repeated voyages of the great mail and passenger boats, since their cargo-capacity is comparatively small; but, as a similar deduction must be made on the return voyage, the comparison between the outward and homeward movements is not vitiated. A further correction must be made for the great emigrant

traffic from Europe, which gives additional employment to outward-bound shipping.

The return cargoes amount to well over 8·0 m. tons. The resulting index, if British ships carried all the cargoes, would be about ·66; corrected for all foreign ships entering our ports "with cargoes" it would be only ·61. As many of the latter do not land much cargo at our ports, the index for British tonnage is probably about ·63. This is evidently too low for a route on which vast cargoes of bulky goods are carried—cotton, grain, oil, timber, meat, sugar, oil-cake, manures, with iron and steel goods and many minor raw materials and manufactures—and a comparison with our Indian figures gives some idea of the correction to be made for the passenger liners. In any case, the great contrast between the outward and homeward loading remains, and it is clear that the westward voyage must be unprofitable in respect of goods traffic. Freight rates ought to be permanently low, since there is, on any basis of calculation whatever, a much greater amount of shipping space available than there is cargo to fill it. Apart from statistics of trade, the vast stream of ships in ballast is sufficient proof of the unfavourable conditions of transport. On many of the trade-routes, our heavy surplus of coal for export gives an advantage to the United Kingdom over Continental competitors in the outward loading of ships; in the North Atlantic this advantage hardly exists. North America takes little of our coal and is likely to take even less; so that on this route Spain remains the chief exception to the general rule.

It may be suggested that Canada provides some com-

pensation for the adverse conditions of exchange with the United States, since Canada is relatively less industrial. Let us examine briefly our commercial intercourse with Canada. On the outward voyage, we find again a considerable movement of ships in ballast, though the proportion is much lower than to the United States. The clearances with cargo to Canada and Newfoundland amount to 2·3 tons net. What of the goods to be carried? A fairly liberal estimate gives ·85 m. tons. About two-thirds of this consists of iron and steel and other manufactured goods; the remainder is largely made up of coal, cement, clay, and salt. The load-index is a little under ·19 and the conditions are practically the same as in the traffic with the United States, so far as the loading of ships is concerned. The imports from Canada and Newfoundland, largely grain, timber, and pulp, amount to over 3·75 m. tons. This, after allowance for transit traffic through the United States, and for the competition of a few foreign ships, gives a load-index of about ·7, rather higher than that from the United States. Again we must evidently make a correction for passenger and mail traffic, in estimating the profits of the voyage, as we can judge from a comparison with Australia and India. The outward passenger traffic to the United States and Canada from the United Kingdom amounted, in 1912, to about 480,000, while the homeward traffic was only about 250,000. Whatever the unknown x which we apply as a correction, the index for westward-bound ships remains extremely low, and the direct voyage must be to the last degree unprofitable, so far as the carriage of goods alone is concerned.

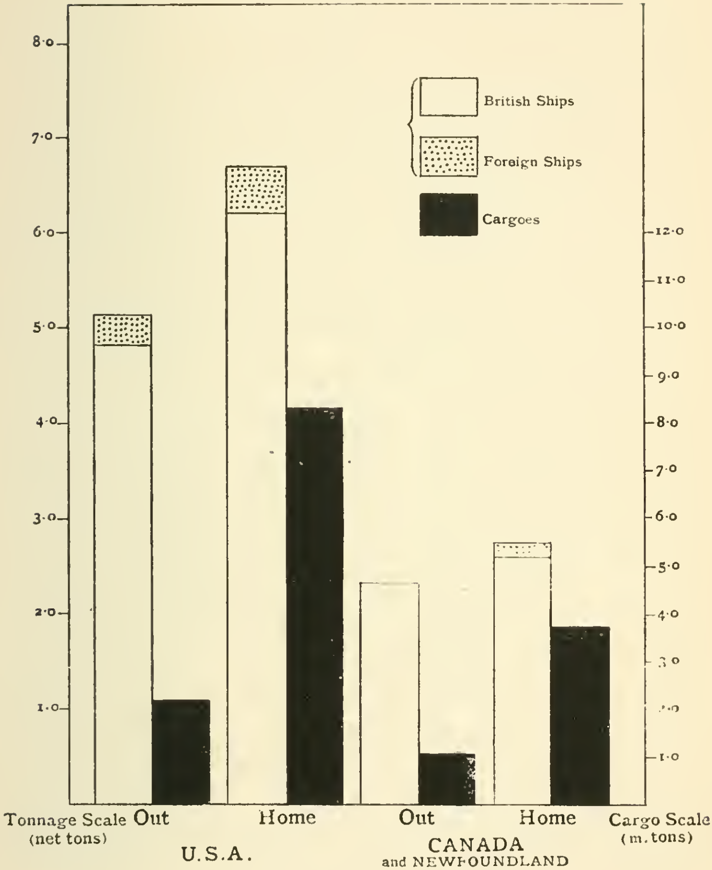


FIG. 9.—NORTH ATLANTIC.

All ships with cargoes, outward and homeward.

The employment of homeward shipping, from the United States and Canada alike, is due to the transport of vast quantities of grain, meat, dairy produce, fruit, timber and forest products; while, in addition, from the United States we import nearly a million tons weight of cotton, large quantities of mineral oil, manures, oil-cake, copper, and lead, together with iron, steel, machinery, and miscellaneous manufactures. The same is true of the Continent. As against this, Europe sends to North America very moderate amounts of raw materials and miscellaneous manufactures. In the light of these facts, the want of balance between outward and homeward cargoes in the North Atlantic and the unprofitable character of the westward voyage may be readily appreciated.

Is it possible to change these adverse conditions so as to approach nearer to a balance in the movement of goods across the Atlantic? The answer to this question involves the consideration of the character of the goods moved. An increase in our export of manufactures to Canada is possible; to the United States it is hardly likely. The balance can perhaps be redressed more readily by a reduction of the movement eastward. Where can such a reduction be looked for? The surplus of foodstuffs available for export from the United States will doubtless continue to decrease; but, in so far as compensation is found in Canada, the employment of shipping will not be affected seriously. The balance may also be affected, to a minor degree, by a reduction in our imports of manufactured goods from the United States; but the two chief items in which changes might be wrought are the impor-

tant raw materials, cotton and mineral oil. The import of these commodities alone into the United Kingdom requires over three million tons of shipping space. The substitution of supplies from the Old World would alter favourably the character of the movement across the Atlantic, since the cotton and oil-producing regions of the Old World offer, as a rule, far better markets for our products than the United States, and therefore better conditions for the exchange of goods, in which lies the essence of economical transport.

So far we have considered only the employment of British steam shipping and the needs of the trade of the United Kingdom; but we must also have some idea of the relations of North America with Europe as a whole. The statistics of the United States, as we have seen, are made up to June 30th of each year, but they can be used as a rough guide to the transactions of the calendar year. In the year ending June, 1912, we find recorded a total entry from Europe, of steamships under all flags, of 16·0 net tons. About a sixth of this total was in ballast. The clearances, practically all with cargo, were about 17·0 tons. Adding the sail, we have a grand total of steam and sail of 16·2 entered and 17·2 cleared, in the direct trade with Europe. The difference, about 1·0 tons, must have reached the United States from regions other than Europe. These figures sufficiently indicate the general character of the North American trade; in the heavy homeward traffic it resembles that of India, but it is sharply contrasted both in the absence of the heavy outward movement of manufactures and coal and in the exceptional size and importance of the mail and passenger

traffic. In one respect it is peculiar. The normal traffic in passengers is to and fro; but the emigrant traffic to North America, involving a net movement westward of over half a million passengers in the year, is rather to be compared to the export of coal in its effect on the balance of shipping.

Our next task is to give reality to our route by locating it on the chart in its physical surroundings. We must realise, in the first place, that Canada is on the way to the United States. The distance from Liverpool to New York is just over 3,000 miles; from Liverpool to Halifax it is about 500 miles shorter. Moreover, Halifax lies on the shortest sea route from Liverpool to New York, though the route actually used by the great trans-Atlantic companies is slightly longer and does not touch Halifax. Montreal is distant from Liverpool about 2,800 miles; while Port Nelson, on Hudson Bay, is also slightly nearer to us than is New York. Thus the interior of Canada, in summer, is actually nearer to us than much of the eastern coast of the United States. A globe will show that the Great Circle from Cape Clear to New York passes near to Halifax, and thence partly over land. It is a parallel to our Great Circle from Panama to Yokohama.

The trans-Atlantic, like the trans-Pacific route, varies its position, though from a different cause. Owing to the danger from floating ice, the route lies farther south in spring and summer than in autumn and winter; but all routes knot up in or branch off from a small area south-east of Cape Race, in the neighbourhood of the "Banks." A Great Circle, from the north-west corner

of Ireland to Colon, taking us through the Windward Passage to Jamaica, passes near to this knotting-up point. To reach New York, we must branch off from the Circle; but the difference to Colon direct or by way of New York is only a matter of a few hundred miles; so that we may consider New York as for all practical purposes a calling-point on the route from this country to the Panama Canal. Now we may understand why the breadth of the Atlantic, or something less, represents the gain to New York, in its intercourse with the Far East, through the opening of the Canal. Instead of diverging to New York, we may continue from the knotting-point on a Great Circle which skirts the coast of the United States, passing the important coaling-point of Newport News at the mouth of Chesapeake Bay, together with the Atlantic cotton ports. The conditions are the reverse of those on the Suez route, where the ports of the United Kingdom are within reach of the traffic between America and the East. We have noted already the possible results of this reversal.

We have still to deal with a small line of traffic which follows in part the old sailing route to North America, that by way of the West Indies and the Caribbean. This route belongs essentially to the North Atlantic, since the Caribbean is equally the terminus of the routes which skirt the American coast southwards. The movement of British steam shipping with cargo to the West Indies and the Central American mainland amounts to about ·7 tons, while the return traffic is little different. There is also an outward movement of about ·2 tons of ships in ballast which do not return direct to the United

Kingdom. Again we must look to Continental ports as the destination of these ships returning eastward with cargoes. Some of this traffic is worked on a semicircular route; the voyage terminates northward at New York and the ships return again by way of the Indies. Much of the island trade is inevitably with the neighbouring mainland, rather than across the Atlantic, and British ships take their share in what may almost be termed a coasting-trade of the American area. This semicircular route is a variant of the much older sailing route, which was across the Atlantic by the south, taking advantage of the Trades, then northwards along the coast of America, and then eastward to Europe by the northern route, with the aid of the Westerlies, thus completing the circle. There is the same kind of circular movement in the Atlantic as a whole at the present day, but on a much larger scale. It is a movement of steamships, and depends, as we shall see when we deal with South America, not on conditions of weather but on the availability of cargo in different parts of the area.

Our export of goods to the West Indian area, amounting to some ·5 m. tons, is of the usual character; about a quarter consists of coal. The load-index is low, only ·3, with allowance for foreign tonnage. The return traffic in sugar, fruits, coffee, hardwoods, and asphalt may be estimated at about 1·25 m. tons, bananas occupying much of the space. This gives a load-index of about ·7, after allowance is made for foreign shipping and indirect trade. The homeward traffic, as so often, seems to be the more profitable. The island traffic is difficult and somewhat costly to work, since many small parcels

of cargo must be picked up from various ports, with consequent delay and expense. Most of the cargoes for the United Kingdom come from the mainland of the Caribbean, though the islands take a large proportion of our exports to the whole region. In the conditions of the organisation and distribution of traffic the route differs widely from the great trunk lines which we have discussed; the nearest resemblance to some of the conditions is perhaps to be found in the West African trade. Our figures, too, deal only with the trans-Atlantic trade; a full picture of the transport conditions must include the local relations with the neighbouring continent of America. The imports into the United States from this region include large quantities of bananas from the mainland of Central America, with smaller quantities from Cuba and Jamaica, sugar in large quantity from Cuba, coffee from the mainland, asphalt from Trinidad, and ores from Mexico and Cuba. Canada also imports sugar from the West Indies on a considerable scale. The exports from the United States consist largely of coal, cement, oil, flour, and meat, with many miscellaneous manufactures of iron, steel, textiles, and clothing. The export of coal and coke alone, to the Caribbean area, especially Cuba, Panama, and Mexico, amounts to about 3·0 tons weight, or half the quantity exported from the United Kingdom to South America; while the import of sugar from Cuba is 1·4 tons. Omitting coal, we may estimate the exports from the United States to the area as about three times those from the United Kingdom in volume, or eight times if coal be included. Competition in the coal business is affected by relative distance, while we have no oil nor food-

stuffs to export; hence our inferior position in the markets of the Caribbean. The return traffic is shared more equally between the United Kingdom and the United States, since both need the special products of the area.

So much for the North Atlantic; but the picture is far from complete. We are left with a great mass of shipping which arrives in Europe from North America but has not previously departed thither from Europe, so far as can be judged from the available statistics, either European or North American. A small part of this tonnage may represent the surplus from the Caribbean; for the great mass we must look elsewhere. We shall find that the South Atlantic reverses the conditions of the North, and so adjusts the balance of movement for the whole area.

The interchange of goods, and therefore the movement of shipping, between Europe and South America is in marked contrast with the interchange between Europe and North America. This statement, at first sight, may give us pause. Both continents receive our manufactures, and we often emphasise the fact that they supply us in return with large quantities of grain and meat. Where then are we to look for the contrast? Are oil and cotton sufficient to reverse the whole shipping movement? Let us examine the South American trade before attempting to answer the question.

In the first place, to obtain a general view, we must add together the figures for Brazil, Uruguay, and Argentina, though later it may be necessary to distinguish them with some care. In 1912, nearly 4·5 tons of British steamships cleared from our ports for South America,

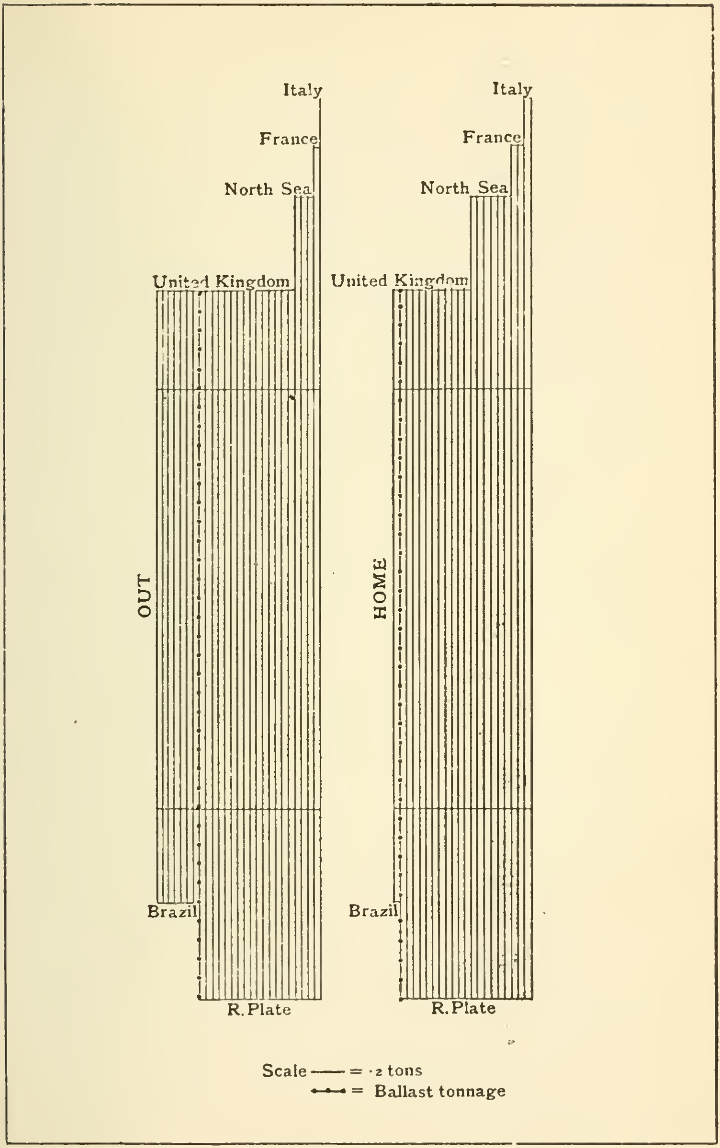


FIG. 10.—SOUTH ATLANTIC.
British steamships, outward and homeward.

thus interpreted. Of this total, about six per cent. was in ballast, that is, either empty or not carrying British goods. On the other hand, the tonnage entered from the same area amounted only to 2·5, of which some seven per cent. again was in ballast. Here we have nearly 2·0 tons of shipping, which must either go outside the Atlantic, after discharging cargo in South America, or must return to our shores from other countries within the Atlantic area.

How can this great contrast between the outward and homeward movement be explained? Let us consider the cargoes carried. In round figures we may estimate our total exports to the area as 8·0 m. tons, and our load-index, adjusted for foreign competition, is about ·9, the highest outward index on any of the great routes. The cause is not far to seek. About seven-eighths of the total carried consists of coal, which naturally provides full cargoes in bulk. Iron, steel, machinery, and cement account for the remainder of the heavy cargo, and there are the usual minor manufactures, more particularly textiles. The return traffic, largely cargoes of grain and meat, amounts to about 5·0 m. tons; and, if we allow for a small quantity of foreign shipping engaged in the trade, the load-index is ·96. So again we have a parallel to Indian conditions.

The South American traffic is peculiar, in that, on the outward as well as on the homeward voyage, the ships are largely engaged in carrying bulk cargoes and economical loads. The movement in ballast, in so far as it is real, and not merely a figment of our statistics, may be accounted for by the seasonal character of the Argentine

export trade. It is not possible to have on the spot, in every month in the year, exactly the amount of ships needed to move the goods coming forward. If there are too few ships at any time, and rates are high, ships may go out from Europe in ballast; if there are more ships than cargo to fill them, or, what is perhaps more likely, if there is too much cargo for the capacity of the port organisation, ships may be compelled to return in ballast. The North American grain crops tend to come forward at a more even rate, partly owing to better market organisation. Possibly the much-abused speculative dealers in Chicago and New York may claim a little of the credit for this.

The movement in ballast is a small matter and may be reduced by improved organisation; the huge surplus of 2·0 tons is permanent, in so far as it depends on the essential character of the trade. This surplus necessarily seeks other markets where return cargoes to Europe are to be found, or clears from South America with cargoes for European countries other than the United Kingdom. We shall trace some of it ultimately to our shores by way of Continental ports.

We must now carry our analysis further, since Brazil and the River Plate area differ greatly in the character and quantity of the products which they export. The British tonnage cleared in 1912 to the River Plate, with cargo from the United Kingdom, was 3·0, approaching three-quarters of the whole cargo tonnage to the group. In addition, nearly all the ships in ballast had the same destination. The tonnage with cargo entered at our ports was a little over 2·1; while the entries in ballast

were rather less than the clearances. On this transaction we have lost somewhere in the South Atlantic nearly a million net tons of steam shipping. An examination of the cargoes carried may throw some light on this. The return cargo amounted to 4·85 m. tons, or nearly the whole of the 5·0 tons exported from the South American group to this country. The homeward load-index is just over 1·0 as contrasted with an outward index of ·86. The traffic is evidently profitable in both directions, but only because the surplus shipping, after carrying out coal, finds work to do elsewhere. The trade is comparatively simple, our imports from the River Plate consisting mainly of grain, especially maize, with meat and minor agricultural products. About three-quarters by volume is grain.

The Brazilian traffic offers a remarkable contrast. The British shipping cleared to Brazil with cargo amounted to 1·2 tons, while the entries were only ·2. The ballast tonnage is negligible. Here we have lost nearly another million tons of shipping. The outward index for all ships is 1·0, and coal constitutes about eighty-five per cent. of the cargoes carried. We may compare this with the outward index to the River Plate; the goods carried are of the same character, but the ships specially fitted for the return meat trade of that region are not likely to carry coal in bulk, or some of the heavier manufactures. There is a marked lack of return cargo from Brazil; what there is consists of small quantities of cotton and cotton-seed, manganese ore, sugar, rubber, coffee, and nuts, amounting in all to rather less than ·15 m. tons. The load-index is only ·28, and the home-

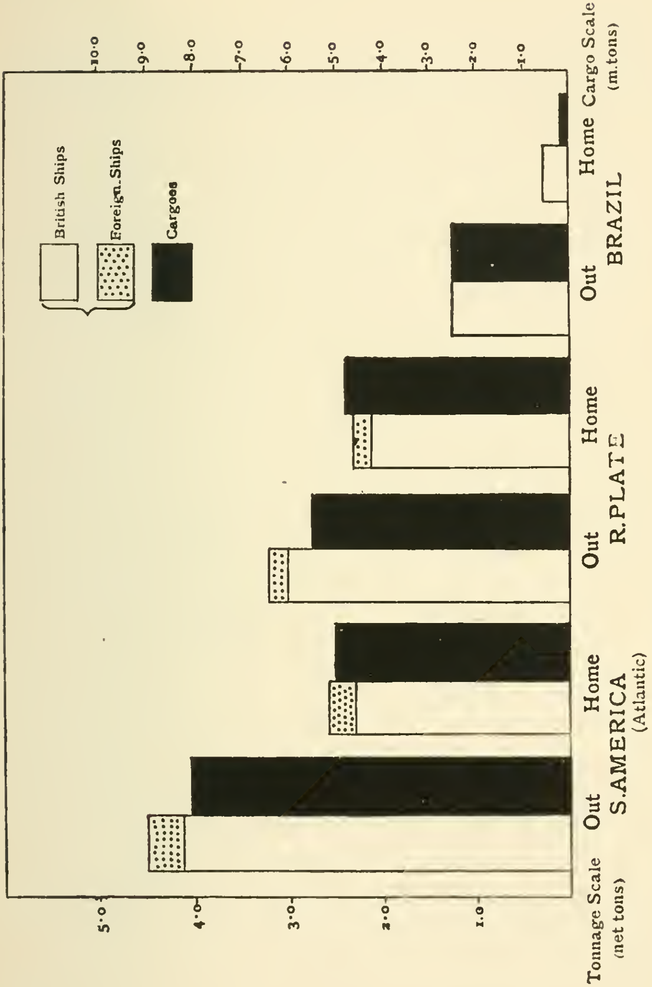


FIG. 11.—SOUTH ATLANTIC.

All ships with cargoes, outward and homeward

ward traffic is distinctly unprofitable. We can contrast this with the River Plate, and can easily understand why so few ships return direct from Brazil to the United Kingdom. In view of this absence of return cargo, we may be justified in looking for a higher level of freight rates to Brazil than to Argentina, since nearly all the ships must seek return loading elsewhere.

We are left, then, with a balance in the South Atlantic of nearly two million tons of British shipping which does not return direct to this country. Can we follow its track? Again we must consider the character of the goods carried and their probable markets. The two chief markets for South American products, other than the United Kingdom, are western Continental Europe, and, to a minor degree, eastern North America. The United States has a large trade with South America, a trade carried on to a great extent in British ships. In the year ending June, 1912, over 1·0 tons of British steamships cleared from the United States for Brazil and the River Plate with cargo; on the other hand, some 2·0 entered, of which two-thirds was in ballast. On balance we have nearly 1·0 tons going north to the United States which did not come south from that country. Evidently in this direction there is employment for about half the surplus shipping from the South American area.

What are these British ships carrying along the coasts of the Americas? Southwards there is a movement of American coal, which, owing to the special conditions of the trade, reached ·5 tons weight in 1912. In addition, we find large quantities of oil, with manufactures of iron and steel and textiles, for Argentina and Brazil. In

return there are dye-wood and hides from Argentina and nearly ·3 tons weight of coffee from Brazil, the whole far from sufficient to load the returning ships; so that the United States records large entries in ballast both from Argentina and from Brazil. We are dealing only with the net result of the whole flow of shipping and must not forget that the individual ship from Europe has the choice of the direct voyage to and fro, or a circular voyage in either direction; thus it may cross the North Atlantic westward, and pick up cargo in the United States for South America, returning thence to Europe with grain; or it may carry coal to Brazil or Argentina and then steam northward in ballast, or with what cargo it can secure, to load perhaps cotton for Europe. None the less, the net result, over the year, is a great flow of shipping, either with cargo or in ballast, in directions determined by the movement of goods to markets.

We will now attempt to examine the problem from the South American standpoint. South American statistics are not full enough for our purpose, so we turn naturally to our own Consular Reports which profess to give information as to shipping movements in considerable detail. We shall find figures in abundance, but the only obvious value of these is to provide intellectual exercise for those interested in the solution of puzzles. The purpose for which the figures were compiled, commercial or scientific, is veiled from the ordinary uninstructed observer. We can gather from the perusal of this heap of undigested and uncorrelated material no accurate information as to the quantity of our shipping trading in this region or the work which it is doing. So,

except for one or two isolated fragments of information, which we may unearth, we can put aside the whole group of reports. We must try, without their help, to account for the other million tons of surplus shipping which we have noted.

We may fairly assume that more than half this surplus is engaged in carrying South American products to Continental ports on the North Sea. In so far as we can disentangle the figures, we find that the entries at these ports of British ships from eastern South America exceed the clearances by nearly ·6 tons. The rest of Europe, including the Mediterranean, might easily account for the remainder; but there is also a small overflow by way of South Africa into the Indian Ocean. In 1911, when the South American maize crop failed, this small flow became a large stream. In that year, the South African accounts record an entry in ballast from South America of more than ·6 tons of British steamships, while the clearances in ballast to India and Ceylon were well over ·5 tons. Unfortunately, in the South African statistics for 1912, for reasons unknown, the details are lacking, and we can only guess at the figure; it was probably small, less than ·1; but the possibility of such an overflow, to meet abnormal conditions, must not be forgotten.

There remains still another comparatively small flow of shipping to be dealt with, before our review of the South Atlantic traffic is complete. About ·5 tons of British steamships cleared in 1912 from the United Kingdom with cargo for the west coast of the Americas. Seventy per cent. of these were bound for Chile, Peru, and Ecuador; the remainder for the Pacific coasts of the

United States and Canada. The entries are about ·4, and the odd ·1 tons, which fail to return from South America, are likely to be found carrying cargo to Continental Europe. On this route, it is vital to take account of sailing ships. The total cleared from the United Kingdom, mostly foreign, especially French, amounted to ·34 tons, bound chiefly for Chile. The entries were only ·16, largely from the Pacific coast of the United States.

Our heavy exports to Chile amount to about 1·0 m. tons, of which coal constitutes eighty per cent., and the rest is made up of iron and steel, machinery, cement, and a few textiles. The export to the remainder of the west coast of South America is only about ·15 tons, and the load-index for the three South American States works out at about ·8, after correction is made for foreign ships, steam and sail, but especially the latter. Sailing ships represent about a third of the total carrying capacity of the tonnage outward bound for western South America.

Now let us look at the shipping which carries return cargo to the United Kingdom. Our chief imports from this side of South America are nitrates, ores, grain, sugar, and wool, the whole not far short of ·5 m. tons; while the shipping entered, steam and sail, is ·35 tons. This gives an index of about ·75, rather lower than that for the outward voyage.

An examination of the statistics of the Continental ports on the North Sea shows practically no British steam tonnage cleared to western South America, but, on the other hand, .1 entered with cargo. The Continent is a market for the products of this region, but the ships on

their outward voyage for the most part are laden with British coal. As our Board of Trade figures do not distinguish the trade of the eastern and western coasts of North America, we will not attempt to work out a load-index; it is enough to note that a considerable sailing tonnage enters our ports from this area.

The combined stream of shipping, to the western coasts of North and South America, comes directly within the zone of influence of the Panama Canal. Valparaiso is 1,500 miles nearer to Liverpool by Panama than by the Strait of Magellan. For full cargoes of coal outwards or nitrates homeward, this saving may not offset the cost of the canal dues; while sailing ships will not be affected at all. So, part at any rate of the stream of traffic round South America is likely to remain. The steam traffic to western United States and Canada will naturally use the Canal, and we may see in this direction both an increase in the total trade and a further substitution of steam for sails. As the route will become part of the larger route to eastern Asia, there may be considerable changes in its working, based on the relation between available tonnage and available cargo.

Whether bound for eastern or for western South America, ships follow the same route through the Atlantic. All routes, both South American and African, knot up in the neighbourhood of the Canary Islands. We started our survey by tracing a Great Circle from the Channel to the Canaries; a continuation of this will just miss the shoulder of Brazil and then carry us along the coast of our South American area, while a Great Circle through Madeira will carry us to Pernambuco. Thus the Island

group lies on the natural route not only to South Africa and Australasia but also to South America and the Pacific.

The position of the Islands has an economic as well as a physical significance. Let us turn back for a moment to our discarded Consular Reports. We find that a considerable portion of the wheat and maize exported from Argentina is not for a fixed destination but "for orders." Ships, too, are cleared for Las Palmas or Tenerife, their ultimate destination being left uncertain. The Islands are in telegraphic connexion with all the great European trading centres, and the cargoes can be directed to the markets where there is the best demand at the moment. Moreover, as we have seen, in the Islands the ships will find stores of coal, to carry them to their destination, at a much lower price than in South America.

The figures available for the Canaries give another aspect of the same facts. Here, we must not use those for 1912, since in that year the conditions in the coal market were peculiar and ships were attracted which would normally pass without calling. Let us turn to 1913. In that year, the tonnage calling, in transit homeward to Europe from Brazil and the River Plate, was about double that calling on the outward voyage. A ship with a full load of coal outward may steam direct to her destination; while, on the return voyage, there is every inducement to call at the Islands, both for orders and for bunker coal.

We will now try to put together a complete outline picture of the tonnage movement in various directions across the whole Atlantic. Taking our standpoint in

the United Kingdom, we find that the total clearances, in 1912, of steamships under the British flag to the Atlantic coasts of North and Central America together with the West Indies and the Caribbean were rather more than 10·0 tons. The entries from the same region were about 9·5, leaving a balance of ·5 which did not return to our shores direct. We must add to this surplus the difference between the tonnage moving eastward to the Suez Canal from North America and that returning by the same route. Moreover, there is a certain quantity of tonnage in ballast from the Canaries and West African area which crosses the Atlantic westward in search of cargo, after dropping its load of coal. Let us estimate a rough total surplus of ·75 tons for the North and Central Atlantic. To South America and the Pacific coasts the clearances were 4·9, the entries only 2·9, leaving some 2·0 tons to be accounted for. So, we have a grand total on the west side of the Atlantic of two and three quarter million net tons of British steamships which we have traced westward across the Ocean, mainly from the United Kingdom, but which do not seem to return direct to our shores. The mass of these ships must ultimately return; from what country is that return recorded? Let us deal first with the great surplus in the South Atlantic.

We may estimate over 1·0 tons as bound for the Continent, especially the North Sea, France, and Italy, with cargoes of South American products. The remainder, nearly another 1·0, we can trace going northwards, particularly from Brazil, some in ballast, some with cargoes of coffee and other goods for the United States. At Port Castries, in the little island of Santa

Lucia, where American coal is to be had for bunkers, over 1·5 tons of British shipping entered in 1912. Santa Lucia is convenient for this northward route. We have, then, a surplus of 1·7 tons in the North Atlantic. Of this surplus, about 1·4 is engaged in the carriage of North American products to the Continent of Europe; the remainder appears as a small stream of shipping, which we noticed long ago, crossing the Atlantic to the Cape, the Indian Ocean, and Australia, but not returning by the same route. A small and uncertain quantity of the South American surplus we have lately noted as entering South African ports in ballast and clearing for Australia or the Indian Ocean. These ships ultimately appear in the Suez Canal, on their way to Europe with eastern cargoes, and finally in the great stream of empty tonnage which is always moving westward across the North Atlantic.

So far we have considered mainly British ships recorded as sailing from the ports of the United Kingdom; to complete the picture we must include those sailing from Continental ports and not recorded in our statistics. We have already estimated a movement of 2·0 tons across the North Atlantic from Continental Europe, and may perhaps take the South Atlantic stream as about half this total. This amount of tonnage must return with cargo for the Continent; and though many ships are doubtless recorded twice over, owing to the method on which our statistics are compiled, the figures, combined with those above, give some idea of the vast amount of work performed by British shipping for Continental nations. The North Sea group of ports alone records

a clearance of British ships with cargoes to South America of about ·7 tons, as against an entry of 1·2, and similar conditions are to be found at many other Continental ports.

We must be careful here to note that we are dealing only with the net result of the movement of all shipping, not with the movement of individual ships. The western Atlantic is a great reservoir, fed by streams of shipping from the United Kingdom, the Continent and Mediterranean, and the west coast of Africa. In this reservoir, groups lose their identity, and each return stream may be made up of ships from any or all of the outward streams.

So the circulation is complete, and we arrive at a rough balance, on the assumption that the mass of ships leaving our shores must return within a reasonable period of time; in other words that the tonnage movement out and home must balance, not for a single route, but for the whole system of world routes. Our figures are necessarily arbitrary, for any selected period such as the calendar year, since ships may leave in one year and return in the next. We are dealing in static terms with dynamic conditions; but on the whole our results will not differ greatly whether we select a year ending in December, March, or June. The density of traffic on a particular route may vary considerably from month to month, with the variations in local conditions, but the traffic for a whole year as compared with another shows considerable stability. Our load-index is not affected by the monthly changes, except in so far as the supply of tonnage at any moment is badly adjusted to the amount

of goods coming forward. The index for the year represents not the actual loading of a ship or group of ships, but the average result of both good and bad organisation and loading on the route.

It is this stability, over a fairly long period, of the traffic taken as a whole, which enables us to assign a special character to a trade route. It is founded on the sum total of the geographical conditions of a region throughout a year, and such conditions on the whole change but slowly, whereas the conditions from month to month may offer sharp contrasts. A very weighty geographical fact, such as the failure of the harvest over a wide area, is needed to upset seriously the volume of traffic on one of the great trade-routes. We can readily allow for such special facts when once we have fixed broadly our normal conditions.

We may regard the North Sea and the Channel as the great Clearing-House of British shipping both on the eastern and western routes. We have seen, in the case of India and the East, how ships leave the ports of the United Kingdom with manufactures and coal and return with food and raw materials to Continental ports. The Atlantic traffic illustrates the same movement on an even larger scale. How does this affect our relations with the Continent? Let us take the North Sea ports as an illustration. We find that the total clearances of British steamships from the United Kingdom, in 1912, to Germany, the Netherlands, and Belgium amounted to about 8·5 tons, about a quarter in ballast, while the entries were about 13·0. Of the latter total, two-thirds was in ballast, either empty or not carrying cargo for the United

Kingdom. Later we may try to account further for this vast movement of ballast tonnage, but it is evident that it can include a large part of the shipping cleared outwards from our ports on the great routes east and west and returning with cargoes not for the United Kingdom but for the Continent.

On all the great ocean routes the passenger traffic is a disturbing element in our calculations; our load-index is in part an indication of the conditions of the carriage of goods, in part a measure of the relative importance of passengers and goods in the shipping business. As a broad general rule, we may assume that the business of transport pays, and that loss on goods must be compensated for by gain on passengers, or *vice versa;* so that the index must be used with caution, especially where the passenger movement outward and homeward shows great inequality. North America offers the most striking instance of the dominance of the passenger element, while in parts of the Indian Ocean and of South America it may almost be ignored. A complete and satisfactory index would involve an elaborate investigation of the space requirements of passengers on various types of ships and routes. By assuming a maximum load of only two m. tons for every net registered ton of shipping, we have already applied a general correction, and by noting the relation of passengers to goods on various routes we have a further corrective. In the remaining area to be considered, the passenger element is of distinctly minor importance, and the index will be found to provide a direct and efficient guide to the employment of shipping in the carriage of goods.

CHAPTER VI

THE MEDITERRANEAN AND THE BLACK SEA

We have seen how one of the most important streams of British shipping passes through the Mediterranean bound for the Indian Ocean. On the way, it picks up a considerable quantity of intermediate traffic, especially in the form of passengers and mails, while, at Port Said, it is joined by an overflow of ships in ballast, ships which have already carried the coal vital to the organisation of the industries and commerce of the Mediterranean area. We must now treat this area as an independent unit, not forgetting, however, its relations with the Oceans outside.

As we draw nearer to the shores of the United Kingdom, we no longer find the comparative simplicity of the distant ocean routes. Conditions of exchange become more complicated; it is more difficult to track out the movement of shipping, since the work done is spread over a wide group of countries, and alternative routes are many; statistics are more difficult to interpret, while foreign competition in transport is at its maximum. We must be content, therefore, to draw in somewhat broad outline a sketch of our mercantile activity around the coasts of Europe, though we are helped greatly by the fact that the key to much of the movement of our

shipping lies with the one commodity, coal, which we supply in quantity to European countries. For this, fortunately, good commercial figures exist by which official statistics may be checked or supplemented.

In the Mediterranean, the coal trade goes far to explain the whole. If we take coal as our guide, we start inevitably with the consideration of Italy, since Italy is, next to France, our largest single market for coal. Here is a country with a population nearly equal to that of England and Wales, a country developing industrially and commercially, but lacking in the sources of mechanical power. The utilisation of her water-power and of her small supply of lignite still leaves Italy dependent for her existence as a manufacturing country on external supplies of coal. For about ninety-five per cent. of these supplies Italy draws on the United Kingdom; the remainder comes largely from Germany.

In 1912, our export of coal, coke, and manufactured fuel to Italy amounted to nearly 9·5 tons weight; to this must be added a fair quantity of iron, steel, and machinery, with some chemicals, clay, miscellaneous manufactures, and fish. Let us put the total at a round 11·0 measurement tons, of which about ninety-five per cent. was coal. Much of this coal was carried in foreign ships, especially Italian and Greek, with some Norwegian, Spanish, Austro-Hungarian, and German, and the total clearances, under all flags, with cargo from the United Kingdom, amounted to 4·6 net tons. In dealing with a region where the traffic is so largely in coal, that is, with tramp rather than liner tonnage, we must alter the basis of our calculations and assume the full capacity of two and

a half measurement tons for every net ton of shipping; otherwise we shall find these ships carrying far more than the maximum. On this basis, the load-index works out at about ·96 for the whole group of ships, the high figure being due to the large proportion of full cargoes of coal. On our original basis, the index would have been 1·2. Of the total tonnage, half was under the British flag. We must make a note of this, since we are concerned mainly with the work done by our own ships.

We see, then, that the coal trade of Italy alone is much larger than that of the whole of South America, though it can be worked by fewer ships, since the distance is less and more voyages can be completed in the year. We must, however, qualify this statement by asking, how do the ships return, and what cargoes are available for their employment? Let us consider the return traffic from Italy to the United Kingdom. The total entries of steam shipping in the direct trade with Italy are only 1·4 tons, while, of this total, over seventy per cent. is in ballast. Evidently there is an utter lack of balance between outward and return cargoes. In fact, Italy has very little to send us in exchange for our exports to her. We receive small quantities of minerals, such as sulphur, asphalt, ores, and stones, with fair quantities of fruit, vegetables, wine, and minor agricultural or pastoral products, and a few special manufactures; but we must not forget the possibility of some of these commodities being forwarded indirectly, by rail from northern Italy. Half of our imports from Italy in 1912, as measured by value, reached us through Belgium and France, though the cheap and bulky goods naturally preferred the sea

route. A generous estimate gives a total of some ·35 m. tons to be carried by returning ships; and the resulting load-index is only ·35 for the ships actually carrying cargo of some kind. It is easy to understand why so much tonnage returns in ballast, and still more fails to return direct to our ports. Of the British shipping alone, 1·8 tons is recorded as carrying cargo to Italian ports and then disappears from our ken, as it returns neither with cargo nor in ballast.

Italy covers a large and straggling area; let us try to follow the ships and cargoes more closely. One half of the coal can be traced to the cities of northern Italy, especially to the Gulf of Genoa. The coal is consigned to railways, ship-building yards, factories, the gas works of the great towns, and to the ports for the bunkering of ships. Farther south, Naples takes a large quantity, and we may note heavy shipments of coking coal to Porto Ferrajo on the island of Elba. The rest is distributed over all the ports which we find on our ordinary maps and some which are not even thus marked. To track out, in our commercial statistics, the destination of cargoes of coal from the United Kingdom to Italy, is to realise how completely every district of that country is dependent on the United Kingdom for the main basis of its industrial and commercial life.

We must now seek for the surplus of shipping which does not return to our ports direct from Italy. Looking at the map, we might expect to find this surplus returning by way of France, Spain, or Algeria, which, together with Italy, surround the Western Mediterranean, a sea within a sea. As a matter of fact, this part of the Mediter-

ranean does not provide the main solution of our problem, as we shall find later; so we will deal first with that larger eastern portion of which Malta commands the entrance.

There are practically no ships, British or foreign, entered from Malta with cargo for the United Kingdom, probably because our small imports from the island are handled conveniently by vessels calling on the voyage from more distant regions. Our sole export in bulk to Malta is coal, which is carried for the most part in British ships. The quantity is only ·5 tons weight in all, and the load-index works out, as we might expect, at the high figure ·98. Taking Malta into account, we must add to our British shipping lost in the Italian area nearly another ·2 tons, bringing the total to a round 2·0 net tons which we must try to track out.

Let us look first on the other side of Italy and consider our trade with Austria-Hungary. Our exports to these countries are not large; we may estimate them at about 1·0 m. tons, nine-tenths of this being coal. The ships carrying cargo amount to ·5 tons, three-quarters of this being Austro-Hungarian and the rest British. The load-index works out at ·8, lower than that for Italy, in spite of the large proportion of coal carried. Perhaps the effective carrying-capacity is reduced by the large proportion of Austrian subsidised shipping engaged, since subsidies as a rule do not promote efficiency.

On the return journey, the cargoes to be carried direct are small, only about ·15 m. tons, mainly unrefined sugar, with a little timber, grain, and flour. We must not be misled by a cursory glance at our Board of Trade

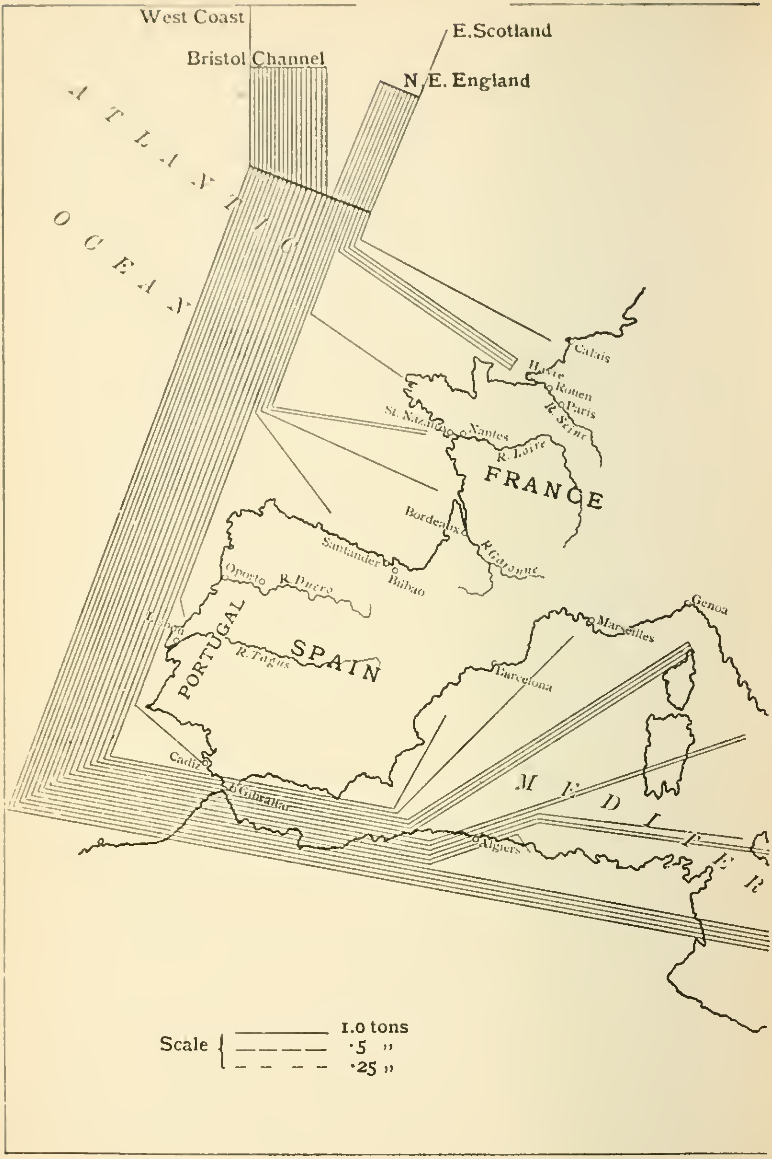
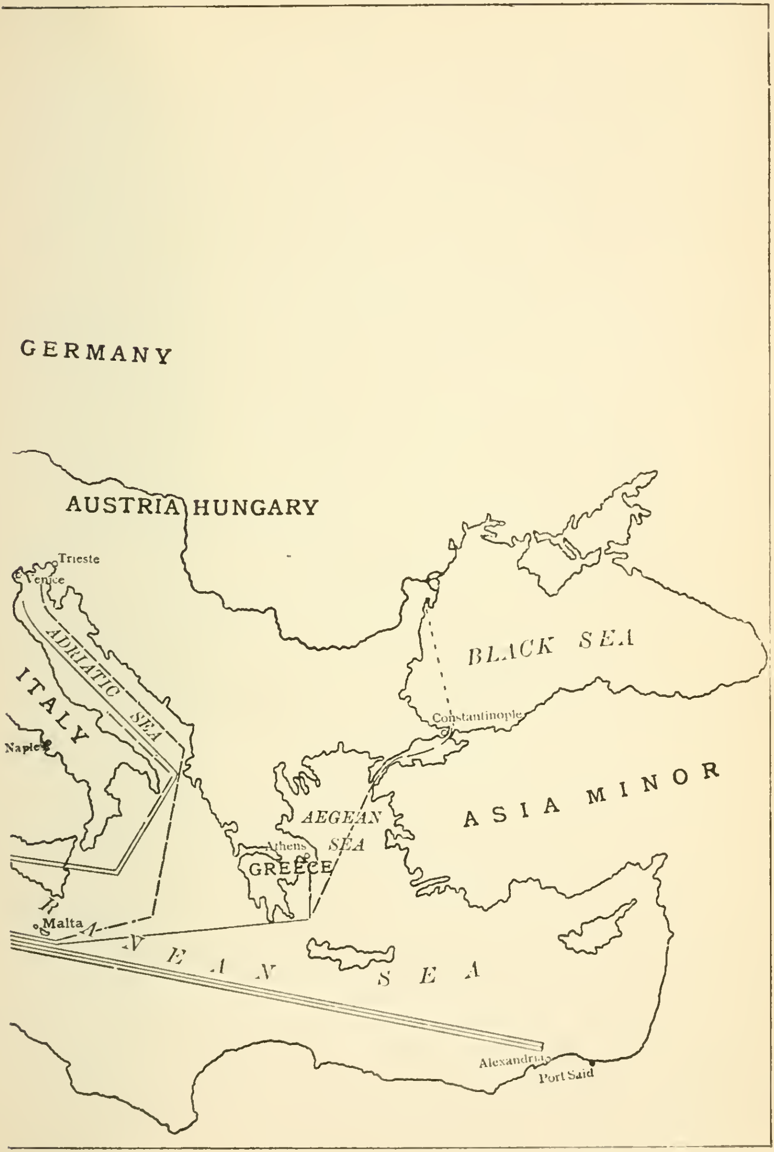


FIG. 12.—FRANCE AND THE MEDITERRANEAN :



COAL TRAFFIC.

statistics, since many of our imports from Austria are not shipped from Trieste but reach us by transit through other countries, particularly Germany, the Netherlands, and Belgium. The load-index is only about ·6; many Austrian ships reach the United Kingdom in ballast, while ·07 tons of British ships do not return direct. In short, so far from the Adriatic compensating, it adds something to the 2·0 surplus for which we must account. We will therefore look still farther eastward.

Next to Italy, our most important market in the Mediterranean is Egypt. Here again the general shipping figures suggest conditions not unlike those of Italy, since, while 1·66 tons, under all flags, are cleared direct with cargo from the United Kingdom, only ·45 so return. Coal, too, constitutes over ninety-five per cent. of the outward cargoes, the rest being mostly iron, steel, textiles, and cement. The total is about 3·6 m. tons, and the load-index about ·86. Most of the ships are under the British flag. We may notice that the average loading for all ships is not so good as that in the Italian trade. We must notice also the destination of the coal; about two-thirds is shipped to Port Said, the rest mainly to Alexandria. The consignments to Port Said are chiefly for the bunkers of ships using the Suez Canal, so that the trade of Port Said may be compared with that of the Canaries, or, on a smaller scale, that of Malta and Gibraltar.

The return traffic, however, is very different from the Italian. It may be estimated at about 1·0 m. tons, for the most part raw cotton, cotton-seed, and oil-cake, with vegetables and a little grain and sugar. The load-index

is ·96, and the return voyage is very profitable, though the balance of cargoes is still in favour of the outward voyage, owing to the great weight of coal exported. As the result of this want of balance, over 1·0 tons of British shipping cleared for Egypt with cargoes from the United Kingdom, which did not enter direct either with cargo or in ballast; so that we have now, in round numbers, 3·0 net tons of British steamships which have mostly carried coal outwards to the central and eastern Mediterranean but can find no return cargoes in that area. This total can be reduced at once by deducting the tonnage in ballast which escapes by way of the Suez Canal. Much of this has been employed in carrying coal to Egypt, but no inconsiderable quantity arrives at Port Said in ballast from Italy and other Mediterranean countries. There still remains, in the eastern and central Mediterranean, over 2·0 tons of British shipping, either from the Italian area or from Egypt, seeking employment for the return voyage within the limits of the Mediterranean area either eastward or westward. Let us continue our survey eastward.

Our chief export to Greece is coal, and we have the high load-index of ·96 for all ships. The return cargoes, mainly ores and currants, give also the index ·96; but there is not enough to employ all ships, so that we find again a small surplus of outward tonnage of British ships, amounting to about ·05 tons. For this surplus, the Turkish dominions more than compensate, since the grain, seeds, wool, fruit, dye-stuffs, and ores which we import thence bulk more than the coal, textiles, and minor manufactures which we export. As a result, the entries

of British ships with cargo from Asiatic Turkey are larger than the clearances by ·1 tons, and this region, though on a small scale, shows conditions of exchange of commodities which contrast with the conditions of that part of the Mediterranean which we have so far examined. Turkey possesses some coal; but how far that coal will suffice for future development is another matter, and we will not attempt to forecast the future conditions of exchange. At present, she attracts a fair number of empty ships seeking cargoes for western Europe, and thus contributes somewhat towards the maintenance of the balance in the Mediterranean.

The total movement of British shipping from Greece and Turkey to the United Kingdom is a matter only of some ·3 net tons, and the excess entries about ·05; but we are dealing in millions, not in thousands, so we must seek elsewhere for employment for our surplus tonnage. We have considered the Suez Canal; let us turn now to another outlet from our area, the Dardanelles and Bosporus. Here there is no such detailed and elaborate information as we find for the Canal, though the Constantinople figures are useful; so we must supplement by estimates and indirect evidence. Let us, then, examine first the conditions at some of the Black Sea ports and see what these suggest.

At Odessa, in 1912, ·09 net tons of British steamships entered with cargo, mainly from the United Kingdom, and ·15 tons in ballast, mostly from Italy and Egypt; while nearly all cleared with cargoes of grain for western Europe, more particularly the Netherlands and Germany. At Nicolaieff, only ·01 tons entered with cargo, but

·35 tons in ballast, to carry the outward loads of grain and ore. Many of the Russian ports show no entries whatever of British ships with cargo, but very heavy clearances. Putting the available figures together, and ignoring minor statistical difficulties, we arrive at an estimated total entry of British ships, in all Russian Black Sea ports, of ·2 tons with cargo and 1·6 tons in ballast, and a total clearance, with cargo, to all destinations, of about 1·8 tons net. The cargoes carried, mainly to western Europe, are grain and ores from the northern coasts, with oil and manganese ore from Batum and Poti at the eastern end of the Sea. The whole may be estimated at between eight and nine million tons measurement, to be carried by the shipping of all nations traversing the Bosporus and Dardanelles.

We are concerned, for the moment, only with the employment of British shipping, so we will now look at the other grain and oil market in this area, that is, Rumania. The conditions, as might be expected, resemble those of Russia. We find about ·25 tons of British ships entered with cargo at Rumanian ports, with ·7 tons in ballast, the latter mainly from Italy, Egypt, Malta, and the United Kingdom. Most of the ships clear with cargo for the Mediterranean or western Europe. Allowing for possible errors and duplication of entries, we may estimate about 2·2 tons of British shipping as entering the Black Sea in ballast, or more than twice the overflow through the Suez Canal. Part of this tonnage comes from regions beyond the Mediterranean, especially the United Kingdom; but we have evidently discovered the chief destination of the surplus empty

shipping of the central and eastern Mediterranean. The cargoes carried, by all ships, British or foreign, from Rumania amount to about half those exported from Russia, so that we may estimate a total movement westward through the Straits of twelve to thirteen million tons measurement of goods.

Let us check our conclusions by a glance at the shipping figures of Constantinople, keeping in mind the difficulty of interpreting the term "in ballast." Here we find British ships entered with cargo ·43 tons, mainly from the United Kingdom and Egypt; entered in ballast, 2·3 tons, towards which Italy contributes 1·0, Egypt ·5, Greece, Malta, France, and other Mediterranean countries together ·4, while the remainder comes from beyond Gibraltar, especially from the United Kingdom. The clearances with cargo are only ·35 tons, largely to Egypt, while over 2·3 tons are cleared in ballast, to Russian, Rumanian, and Bulgarian ports. The two groups of figures correspond with sufficient accuracy, and we can measure the importance of the Black Sea as a receptacle for the overflow both from the Italian area and from Egypt.

Putting together the ships entering the Black Sea both in ballast and with cargo, we find that the British tonnage, moving past Constantinople westward-bound, and all well loaded with cargo, amounted in 1912 to a total of about two and a half million tons net, this, too, in a year of poor trade, high freights, and war conditions which involved the temporary closing of the Straits. In a normal year, the movement of tonnage to and from the Black Sea would be larger, while there would be a cor-

responding reduction in the overflow of ballast tonnage through the Suez Canal. It is clear, therefore, that the Bosporus and Dardanelles can be placed side by side with the Suez Canal as a great artery of homeward traffic for our merchant navy, though a much larger proportion of the outward traffic is in ballast, since the Black Sea does not compare with the Indian Ocean as a market.

We must now return to the question of the trade of the United Kingdom, and consider the destination of these ships and cargoes coming from the Black Sea. This, as we shall see, is of vital importance. Of the British shipping entering the ports of southern Russia, only about ·15 tons, or a twelfth of the total, enters direct from the ports of the United Kingdom. Even of this small quantity a third is in ballast, perhaps tank steamers coming for oil. In default of coal, which is not needed here, our exports to this area are small in quantity, considerably less than ·1 m. tons in all. The load-index for the ships, mainly British with a few German, which carry these exports, works out at the low figure ·25. The return tonnage, with cargo for the United Kingdom, is ·53, of which five-sixths is British. There is evidently more cargo to be carried on the homeward voyage. Our imports of grain, ores, and oil are in the neighbourhood of 1·3 m. tons, the result being a load-index of about 1·0. This figure seems to suggest that the effective capacity of some British ships is rather higher than the capacity assumed as the basis of their legal net tonnage. Be this as it may, the homeward voyage provides certainly very full and profitable loads for the ships, and the figures

enable us to appreciate the convergence of empty tonnage on southern Russia.

Rumania offers an interesting contrast to Russia in her relations with the United Kingdom. The clearances, direct to Rumania, with cargo, are ·2 tons, and the entries, under all flags, ·24 tons. Rumania takes from us fair quantities of coal, together with iron, steel, and miscellaneous manufactures, to a total of about ·35 m. tons; so that the outward load-index is over ·7, in contrast to that for Russia. The return cargoes of maize, wheat, and oil from Rumania are nearly twice the quantity of the outward, and the load-index is about 1·0, as for Russia.

In short, we may say that ships normally leave the Black Sea loaded to their full capacity; but we must be careful to note that not all, even of the British ships, are carrying cargo for the United Kingdom. This country takes only a fraction, and that a small fraction, of the surplus products of the Black Sea area. Of the twelve million or more tons of grain, ores, and oil traversing the Straits, only about a sixth reaches our ports, and three-quarters of the British shipping is carrying to foreign countries. Can we form any idea as to what countries are thus served? Let us consider once more the trade of Odessa.

At Odessa, we find less than ·1 tons of British ships recorded as clearing with cargo for the United Kingdom, while ·14 tons are bound for the Netherlands and Germany. Of the shipments of grain, nearly ·5 tons are for those countries, as against ·12 tons for the United Kingdom. From Nicolaieff, again, four times as many ships cleared

for Germany and the Netherlands as for the United Kingdom, while Rotterdam took four times as much ore as this country. There are also some sailings to France and Belgium, but it is evident that the mass of our ships at these Russian ports is doing the work of Germany, since Rotterdam means Germany. Of the cereal exports of the Sea of Azov, to the Netherlands, Germany, Italy, and the United Kingdom are assigned about equal quantities; to France rather less. Here, too, Germany takes a double share; while she is also the largest consumer of the iron ores from Nicolaieff and the manganese ore exported from Batum and Poti, though British ships do not seem to do much of this carrying for her.

If we look at the Rumanian exports we find again very large quantities destined for Belgium and the Netherlands, with smaller quantities for the United Kingdom, Italy, and France. In this carrying-trade also British ships have a share. Putting the figures together, we find that, in the first place, Germany is a larger consumer of Black Sea products than is the United Kingdom; furthermore, that a very considerable portion of the German import is carried in British ships, which depend for employment, on the outward journey, on the export of British coal to the central and eastern Mediterranean. Over a million tons of our shipping are thus employed for the benefit of Germany. We thus have a parallel to the conditions which we found in the traffic of the Indian Ocean and South America.

We have located, in the Black Sea, a large part of the Italian overflow of tonnage in ballast; for most of the remainder we must look westward. Let us consider first

the African coast, Algeria and Tunis. Nearly the whole of the 1·75 tons of the exports from the United Kingdom to this region is coal, either for the railways or for the bunkers of ships, since Algiers and Oran are calling-points for steamers traversing the Mediterranean. In the case of Algeria, the clearances with cargo under all flags amount to ·6 tons; the entries are ·45 tons, together with a considerable tonnage of ships, mainly foreign, in ballast. This is explained by the trade figures. Our exports to Algeria, mostly coal, may be estimated at 1·5 m. tons, while our imports of ores, grain, manures, and esparto are about 1·1 m. tons; so that there is less to carry homeward than outward. The load-index outward is 1·0, and homeward slightly lower at ·98; but the return cargoes seem to be carried mainly in British ships, since the movement of these each way is about the same, while many foreign ships return empty, or, at any rate, without cargo for the ports of the United Kingdom. As far as concerns British ships, therefore, we may regard Algeria as complete in itself, and not disturbing the Mediterranean balance; much of its traffic is naturally local, across the narrow sea, to and from France, the mother country.

The case of Tunis is somewhat different. The cargo exported is again chiefly coal, while the imports are ores and esparto, with manures; but the volume of the imports is more than double that of the exports. As a consequence, the entries with cargo, under all flags, are more than double the clearances. The load-index outward is 1·0, and the same homeward, so that ships are evidently well employed in both directions. If, however,

we consider British ships only, we find that the entries exceed the clearances by ·15 tons; in fact, there are very few ships cleared direct, the coal being carried in foreign ships. The ·15 tons must carry outward cargo elsewhere, and we have here the possibility of a minor overflow from Italy and Malta; so that Tunis, like Turkey, assists in the adjustment of the Mediterranean balance of cargoes.

We now turn to a more difficult problem, that of the south of France and the Mediterranean coasts of Spain—difficult, partly owing to the great transit traffic of Marseilles, partly because our Board of Trade statistics give us no help in dividing the Mediterranean from the Atlantic trade, even in the case of France, though the conditions are utterly different on the two coasts. We are sure only of one fact,—while, in 1912, Marseilles and neighbouring ports imported over 1·0 tons weight of coal from the United Kingdom, the ships could find little in the way of bulky cargoes to bring back. Much of the coal was carried as usual in foreign ships. We have noted already a considerable amount of shipping reaching the Black Sea in ballast from France, and we find this returning with cargoes of grain and oil. The remainder of the French overflow we may expect to find in the western Mediterranean, but we will not attempt to estimate its volume; it does not seem to be very large, so far as British shipping is concerned.

We will conclude our review by a glance at the Mediterranean coast of Spain, which acts as a minor clearing-house for empty tonnage and goes far to complete the adjustment of the balance of cargoes. Let us examine

first the eastern coast of the Peninsula, from Barcelona to Cape Palos. Barcelona represents a manufacturing district, which tends to import more than it exports in volume. The chief import from us is coal, well over ·5 tons weight; while a large quantity of British shipping clears from Barcelona in ballast. Thus, the conditions resemble those of Marseilles. On the other hand, the Provinces of Tarragona, Castellon, Valencia, and Alicante take only small quantities of goods from us, but export large quantities of fruit and vegetables. Taking together all the ports of these Provinces, we find over ·4 tons of British ships clearing with cargo, but only ·1 entering; the remainder must enter in ballast, either coastwise or from foreign ports. Of the ·25 empty tonnage entering from foreign ports, we can trace at least half to France and Italy. Over a third of the outward tonnage is bound for the United Kingdom, with cargoes of fruit, particularly oranges, and of vegetables.

Let us continue our survey and consider the coast from Cape Palos to Gibraltar. Here we find a new element in the trade, due to the mineral deposits worked in the mountain region in rear of the coast, in the Provinces of Murcia, Almeria, Granada, and Malaga. We find, indeed, exports of wine and fruit, especially grapes, with esparto, but the ores of iron and lead are of far greater importance from the point of view of the employment of shipping. On a rough estimate, we may take the total heavy exports of this region as not far short of 2·5 tons, mostly iron ore. Of this, about half is bound for the ports of the United Kingdom, a little to France, and the rest largely to the Netherlands and Germany. Again

grouping the shipping of the ports, to avoid unnecessary complication, we find that the total entry of British ships with cargo is only about ·15 tons, of which about three-quarters carries coal and manufactures from the United Kingdom, mainly to the two chief centres of population, Carthagena and Malaga. The clearances, all with cargo, amount to ·75 tons, and the balance enters in ballast, in search of employment. Of the empty tonnage, we can trace nearly ·4 to Italy, and ·1 to France; so that we have gone a long way towards accounting for the rest of our Mediterranean surplus.

For the final adjustment of the balance we must look to the next section of the Spanish coast, from Gibraltar to the Portuguese frontier, with the Provinces and towns of Cadiz, Seville, and Huelva. Again the sole import in bulk is coal from the United Kingdom, to a total of about ·4 tons weight; on the other hand, we find a shipment of about ten times this quantity of iron and copper ores in various forms, together with some pig iron and lead. About a quarter of this total is credited to the United Kingdom, about as much to the United States, rather more to the Netherlands and Germany, with fair quantities to France and Belgium. Cadiz shows, moreover, a heavy export of salt to Newfoundland and South America; so we are evidently here outside purely Mediterranean conditions and are becoming involved in the larger ocean trade-routes.

The shipping returns of the district reflect the trade conditions. The entries of British ships with cargo, mainly from the United Kingdom, are only ·25 tons, while ·75 tons are in ballast; the clearances, practically

all with cargo, are about 1·0, rather less than half to the United Kingdom, the remainder to the United States, the Netherlands, Germany, and Belgium. In this region we find again a most marked reversal of the normal Mediterranean conditions, since the cargoes shipped exceed greatly in bulk the cargoes received.

Of the entries in ballast, Italy is credited with ·25 tons, the last of the great overflow of 1·8 tons which we have been tracing; a considerable quantity comes from France, Algiers, and Gibraltar, and the rest from the United Kingdom, Portugal, Madeira, and the Canary Islands. We can understand the last item by referring to our first chapter. In the outward movement of traffic from this district of Spain there is a new factor to be noted, that is the clearance of ·32 tons of British shipping with cargoes of ores for the United States, with no corresponding entry. We have already discussed the significance of this movement in dealing with the traffic of the North Atlantic.

There still remains, to complete our survey of the Mediterranean, Gibraltar, the guardian of the gateway. Gibraltar concerns us here only as a coaling-station and port-of-call. It imports about ·35 tons weight of British coal, and little else. The ships carrying this traffic are mostly small, and the British ships cleared with cargoes amount to ·1 tons. Some of these, on the return voyage, may load a few goods at Gibraltar, and complete their cargoes at neighbouring Spanish and Portuguese ports, though they are credited in our statistics to their starting-point; others bring nothing from Gibraltar and are therefore credited to a later point of loading. For all practical

purposes, we may consider them as returning from Spain and Portugal, and that Gibraltar has no trade except the import of coal. It shows the same conditions as Malta or Italy, but hardly affects the Mediterranean area proper.

The whole stream of traffic for the Black Sea and the Suez Canal, and locally for the Mediterranean, passes within sight of Gibraltar; but, unfortunately, we have no figures to check it, such as we found at Constantinople. We will, however, try to form a rough notion of the volume of this stream, by putting together our various estimates, and eliminating, as far as possible, overlapping statistics.

The British shipping, from western Europe passing eastwards for the Mediterranean and Black Seas, we may estimate, in round figures, as 6·0 net tons. Of that bound for the Mediterranean, nearly all carries cargo, for the most part coal. Over half the total is employed in the trade with Italy and Egypt. The British coal, coke, and manufactured fuel exported to the whole region, in 1912, amounted to about nineteen million tons weight, but much of this was, as we have seen, in foreign ships.

To the Mediterranean stream must be added the traffic from western Europe and the United States through the Suez Canal, together with a not inconsiderable tonnage carrying goods from North and South America to Mediterranean ports. We thus arrive at a grand total in the neighbourhood of eleven million tons net, of shipping under the British flag, passing eastward through the Straits. What of the return stream? We have seen

before how some of the shipping, cleared for the Mediterranean with cargoes, leaves by way of the Canal, in ballast; but, as it returns by the same route with cargo, our calculations are not affected. None the less, the westward stream is larger than the eastward, since it is increased by the tonnage which reached the Indian and Australian region by way of the Cape but returned through the Suez Canal. The difference we found to be about 1·0 tons. We are now in a position to compare the stream of traffic passing Gibraltar with that passing the Canaries and Madeira. The former is the more important, as measured by the tonnage movement, but we must not forget that on the route to the East a larger proportion of mail and passenger ships is employed. Moreover, the eastward tonnage is largely employed in the local coal traffic of the Mediterranean.

We have discussed already that section of the traffic in goods which goes or returns through the Suez Canal; let us turn for a moment to the Mediterranean. Taking the Mediterranean proper, we find the volume of goods moving into it from the United Kingdom to be between twenty-one and twenty-two million measurement tons. The return traffic is between six and seven million tons; and the contrast would be greater except for the heavy exports from south-eastern Spain. The Black Sea trade shows a difference in the opposite direction; and we shall be sufficiently near the mark if we put the total moving eastward from the United Kingdom to the whole Mediterranean region as twenty-two million measurement tons, as against some eight and a half millions returning westward, in the ships of all nations. The last figure is below

the normal owing to the special conditions of the Black Sea trade in 1912.

We can now understand why, in the first place, so much tonnage takes the exit through the Suez Canal; why, in the second place, so much of the tonnage from the Black Sea and from Spain, the two chief sources of cargo, has its destination on the eastern shores of the North Sea; and finally, why some ships must return from the Mediterranean in ballast to western Europe. The movement of shipping depends on ultimate geographical conditions—the production and consumption of different kinds of goods in different parts of Europe. Such conditions are constant over considerable periods of time; no political re-organisation can alter the broad essential facts of the distribution of and markets for the important raw materials and foodstuffs in the carriage of which our ships are largely engaged. The flag may change, but the work must still be performed, and the stream of shipping must continue to flow.

CHAPTER VII

THE NORTH SEA AND THE BALTIC

We have now dealt with the main portion of the long sea routes, and have found that each has a distinct character, depending on the amount and type of goods carried in each direction and the relation between passengers and cargo. We come now to the region where the great world streams knot up or divide on their way to and from the terminal ports.

The progress of the ship, either inwards or outwards, in the neighbourhood of the coast of Europe, is far from simple or direct. There are many ports-of-call near the end of the routes, and a considerable choice of terminals; so that the stream, shown as simple on our chart, really splits up and combines again in the most bewildering fashion. Mixed with and crossing the main flow in every direction is the local traffic of western Europe, a traffic which more and more takes on a coastal character as we approach the North Sea. As a result of this mixture, the statistical material becomes extremely complicated, and we must be content to deal with a few only of the salient aspects of the trade. A complete analysis is far beyond the scope of our present inquiry.

Let us begin with a brief survey of the conditions on the western coast of the Spanish peninsula and the coasts

of Spain and France bordering on the Bay of Biscay. The movement of British shipping on the small section of coast between Cadiz and Huelva may be estimated at about 1·0 tons, inward and outward; but of the entries three-fourths are in ballast, while practically all the ships are cleared with cargoes. We have seen, before, that most of this ballast tonnage is an overflow from the Mediterranean; the remainder is from Portugal, the Canaries, and Madeira. The ships entered with cargo are for the most part from the United Kingdom, though there are some arrivals from the eastern side of the North Sea. The clearances show a marked contrast; about half the tonnage is bound for the United Kingdom, a third for the United States, a little for Canada and the Argentine, and the rest for the Netherlands and Germany. How is this distribution to be explained? The district exports over 4·0 tons weight of metallic ores, mainly of iron and copper, together with considerable quantities of salt and wine, while the only bulky import is British coal in moderate quantity. The lack of balance of cargoes explains at once the inward movement of ships in ballast. As to the distribution of the cargoes of ore, over three-fourths are divided between Germany, the United Kingdom, and the United States, while most of the remainder goes to France and Belgium. The salt of Cadiz finds a market in the Argentine and in the fisheries of Newfoundland; but this traffic, to judge from the statistics, does not engage many British ships.

Let us now compare the conditions of this area with those of Portugal. We send to Portugal over 1·0 tons weight of coal, coke, and fuel, with many manufactured

articles and minor foodstuffs and raw materials from our markets. In return, we take some fish, fruit, vegetables, and wine; but the chief goods requiring shipping space are ores, cork, and timber. Portugal ranks next to Sweden as a source of one of the most necessary materials for our industries, that is pit-props.

Although the cork and pit-props occupy much space, the outward cargoes from the United Kingdom, owing to the heavy shipments of coal, are more than twice the volume of the return cargoes; so that the clearances direct to Portugal are larger than the entries, while many of the returning ships, especially those under foreign flags, arrive at our ports in ballast. There is, therefore, an overflow of tonnage from Portuguese ports, which finds employment on the neighbouring coasts of Spain, where the conditions are reversed. In fact, for purposes of transport, the Atlantic and Biscayan coasts of the Iberian Peninsula, together with the south of France, may be treated as a single area.

There is another aspect of the trade of Portuguese ports which must not be forgotten. If we look at the figures for Lisbon and Oporto, we find that these seem to indicate a far greater movement of shipping than is suggested by our Board of Trade statistics. The reason is not far to seek. These ports lie on the edge of the South Atlantic and Eastern routes, and many ships engaged in the South American trade call on the outward or homeward voyage. Some of these may pick up or drop cargo locally, while others merely touch, and may be recorded as in ballast; so that Portugal has a traffic due to its position on the world routes, in addition

to that based on its production and consumption of goods.

We find the same peculiarity, to an even greater degree, shown by the group of ports at the north-west corner of Spain, among which Vigo has the largest tonnage movement. This district is neither a great producer nor a great consumer of goods. It imports a little coal and maize, with a few manufactures, and exports sardines, wine, and some pit-props; yet it shows a movement, both inwards and outwards, of about 2·0 tons of British shipping alone. Vigo and Coruña are important emigration points, and the emigration from the Peninsula is naturally directed to South America; so that, while both streams of traffic, that to the East and that to the South, pass within sight of Finisterre, and from the naval point of view this is one of the world controls, the relations of the neighbouring ports of Spain and Portugal are confined for the most part to the South Atlantic stream. The main stream continues north to the Channel, but a branch diverges to the Biscayan coast of France; so that Finisterre is in every sense a junction of shipping routes.

We turn the corner and find at once a change from the long-sea to the coasting type of traffic. This traffic is associated with the group of ports which occupies the south-eastern corner of the Bay of Biscay. We will consider first the Spanish section, consisting of Bilbao, Santander, and smaller ports in the neighbourhood. Here, over three-quarters of the British tonnage i entered in ballast. The greater part of this emptys tonnage is credited to France; the rest to Portugal and

the United Kingdom. Of the outward ships with cargoes, two-thirds are destined for the United Kingdom, a quarter for South America, and the remainder for Germany and the Netherlands. Let us look for an explanation.

The group imports coal and coke from the United Kingdom, but only in moderate quantity, since it draws largely on native supplies. There is little else for us to send; hence the small number of ships entered with cargo from the United Kingdom. On the other hand, ships are needed to carry away over 4·0 tons of iron ore, the chief product of the district. Of this ore, over half is for our use, most of the remainder reaches Germany, either direct or through the Netherlands, while France takes the balance. Much of the trade is carried in foreign ships, but the figures for British shipping and goods taken together illustrate sufficiently the conditions of the traffic and the reason for the convergence of empty tonnage on the area.

For the complete explanation of the origin of the tonnage we must turn to the south of France, from St. Nazaire to Bayonne. The chief import of this region is some 3·0 tons weight of coal, normally from the United Kingdom, though, in 1912, owing to the strike, a small quantity was drawn from Germany. In addition, we find some building timber from the Baltic and the United States, with supplementary food and forage grains from America and the Black Sea. The mass of the trade belongs to the coastal type, and coal, for railways, ships, and factories, is the one really important item. On the other hand, the region exports very large quantities of

pit-props to the United Kingdom, together with some minor forest products, such as turpentine and resin. France is, next to Russia, our chief source of supply for pit-props, Sweden coming third and Portugal fourth in order.

The export from this region, large though it is, employs only a part of the tonnage required to carry the imports; so that many British ships enter with cargo from the United Kingdom or more distant regions but clear in ballast for the neighbouring ports of Spain. Some also return in ballast to the United Kingdom, and this fact may seem to suggest that, even with the inclusion of the Bilbao district, there is not at all times sufficient cargo available for the returning ships. We must not, however, be too ready to draw the conclusion. As we approach our own shores, we find movement in ballast more frequent, since the question of time becomes more vital. Over a short distance, it may pay to return empty, rather than to wait for a cargo; so that we must not press too far the idea of the double voyage.

With the sole exception of that part of the North Atlantic route which rounds the north coast of Ireland, all the great world routes converge on the narrow strip of water lying between Cape Ushant and Cape Clear, the most important traffic junction in the World. Within this line lies a series of inland lakes, across which ships, large and small, move in every direction. Here we shall make no attempt to isolate the various streams of traffic; instead, we will take as our guide to the intricacies of the problem the one bulk commodity which dominates the whole local movement. We will ignore the vast

miscellaneous traffic in manufactures, a traffic carried largely in small boats of the packet type, running to scheduled time, in connexion with the railway systems of the United Kingdom and the Continent. Our key commodity is coal.

In 1912, our total export of coal, exclusive of coal for bunkers, was between sixty-four and sixty-five million tons weight, to which must be added two and a half million tons of coke and manufactured fuel. Of this vast mass of coal, about six-sevenths was destined for European countries and the Mediterranean. The coal trade with South America, with the supply of the South Atlantic routes, important though it is, represents but a small fraction of our total business. Italy alone takes as much from us as the whole of this region. Of the European total, we may credit about a third to the Mediterranean, an eighth to the Atlantic coasts of France, Spain, and Portugal, and the remainder, rather more than half the total, to regions bordering on the Channel, the North Sea, and the Baltic.

Though the chief coal area of France lies in the north corner, the supply is not sufficient for her industries and commerce; so that about half her imports from us are for the Seine, the cross-Channel ports, and the iron district of Caen. The Seine, her chief ocean outlet, naturally takes the largest share, while Rouen is the largest single market. The ores of the Caen district, the granites of Brittany, and the flints of the Dieppe beaches represent the heavy cargoes to be sent in return. These amount perhaps to a tenth of the volume of the coal imported, so that we need consider only the outward

flow of coal; and to obtain a clear view of this flow we must investigate its source.

Roughly, five-sixths of our export of coal originate from the Bristol Channel and the north-east coast of England. The export from Northumberland and Durham, with the addition of the Humber, is slightly greater than that of the South Wales area. The remaining export is for the most part from the east of Scotland, with small quantities from the Mersey and the Clyde. Manufactured fuel comes mainly from South Wales, and coke from the Durham field.

In the Channel, and along the Atlantic coasts of France and Spain, we find Welsh and North-Eastern coal competing on fairly equal terms; in the Mediterranean, Welsh coal has the larger share of the market; in the South Atlantic its share is still larger, while beyond Suez it has almost a monopoly. In the North Sea, the conditions are reversed; less than seven per cent. of the coal carried has its origin in the Bristol Channel, and we may ignore this and consider the trade from the east coast alone. Of this trade, the Tyne area is to be credited with nearly half, the Scottish ports with rather more than a quarter, and the Humber with rather less. The whole stream, eastward-bound, north of the Straits of Dover, including the contribution from South Wales, amounts to over twenty-five million tons weight of coal, and needs for its carriage the movement of ten million tons net of shipping during the year. A long belt, fringing the Narrow Seas, is largely dependent on our steam, gas, and coking coals for the bunkering of its ships, the working of railways, factories, and furnaces, and the lighting of

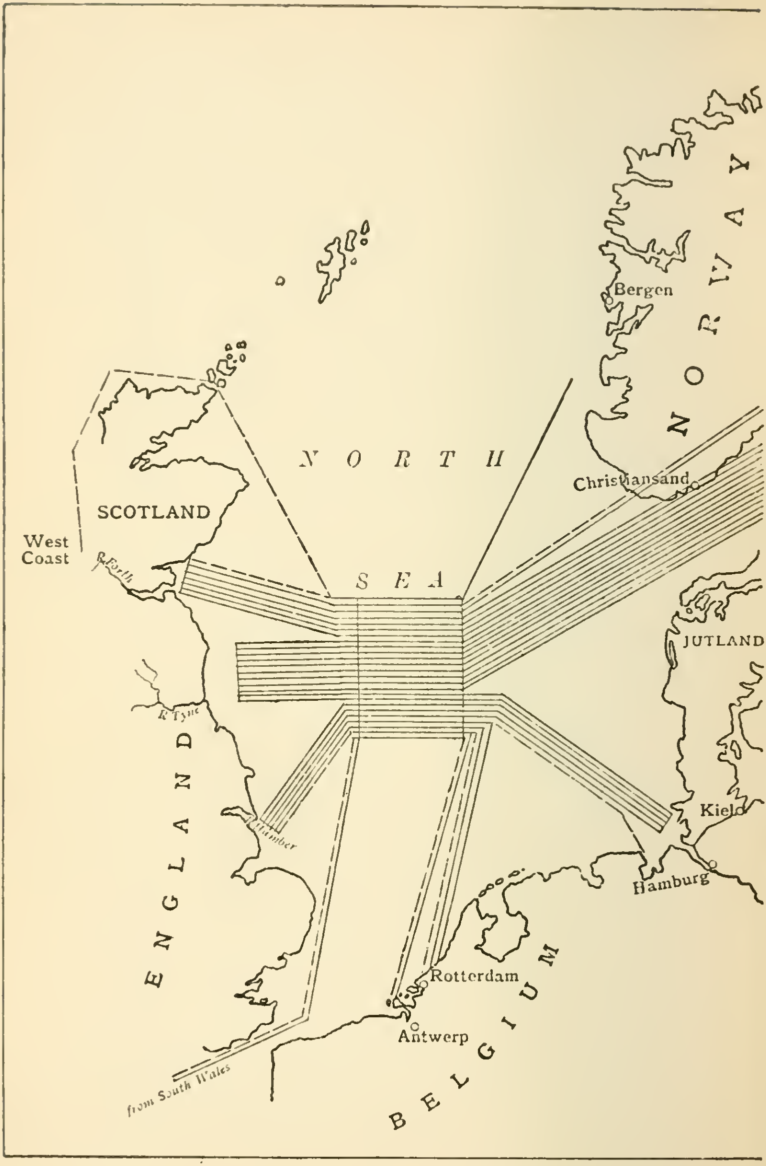
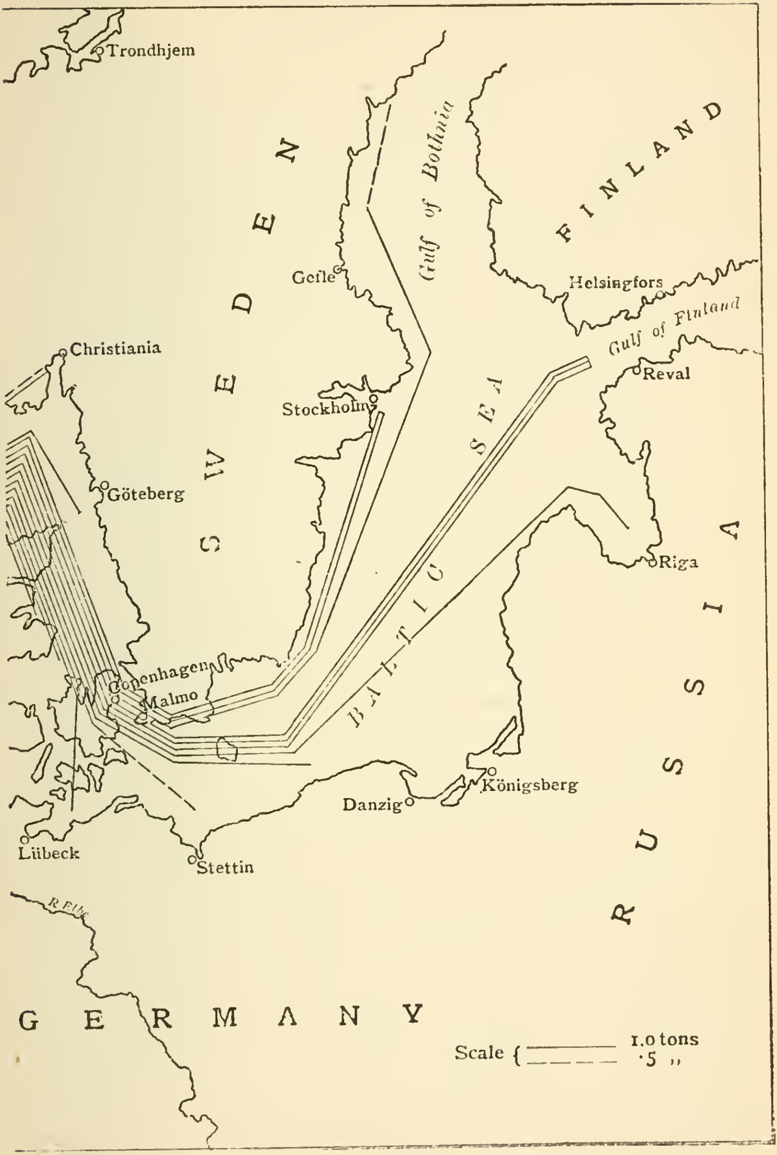


FIG. 13.—THE NORTH SEA:



Coal Traffic.

its towns. The east coast of Britain can supply every kind of coal required for these purposes, except the very best steam, which is somewhat a luxury and must be procured from South Wales.

We will now look more closely at the destination of this coal. Over a third of the total from the east coast of Britain is carried but a short distance, to the opposite coast of the North Sea between the Kiel Canal and Dunkirk. The conditions of the trade are worth a brief notice. Amsterdam, Rotterdam, and Antwerp may be classed, roughly, with Havre, Bordeaux, and Marseilles as markets with a consumption of British coal approaching or exceeding a million tons. Small quantities of coal are shipped also to minor Dutch and Belgian ports. The bulk of this coal is intended for bunkering ships and for the local needs and industries of the ports, though some penetrates inland.

The Belgian import may strike us as peculiar. Belgium produces coal in large quantities, and exports by land, especially to France; at the same time she imports from the United Kingdom, from Holland and from Germany. To appreciate this, we must remember that coal is of various types and qualities, and that the Belgian fields are inland while ours are near or on the seaboard. The total export from the United Kingdom is only about 1·5 tons weight, of which about two-thirds is for Antwerp. Coal forms the mass of our heavy export to Belgium; but we must add to this raw materials, such as cotton, jute, wool, supplied through our great markets, together with iron, steel, chemicals and manures of our own production. In return, we receive iron and steel, in

various forms, stones, sand, cement, glass, and chemicals, in addition to certain agricultural products, such as sugar, vegetables, and fruit. The total volume of these is very large. In both directions there is an enormous movement of minor raw materials and manufactures which we will not attempt to analyse; it is an interchange natural to two highly developed industrial areas where tariffs do not offer a very serious impediment.

The entries and clearances of all shipping with cargo in the trade of the United Kingdom with Belgium are not far from equal; but the figures for ships in ballast are in strong contrast. There is a net entry of British ships alone of 1·70 tons. This is not to be explained by local trade conditions, and we must look back to an earlier chapter. We found that Antwerp was a terminus both for the South American and the Far-Eastern route, and that ships which departed with cargoes from the United Kingdom on these routes returned with foodstuffs and raw materials for Continental markets. For these markets Antwerp is one of the chief inlets. So we trace the ships at last, returning in ballast across the North Sea to pick up more cargoes for export from the United Kingdom.

Let us now continue our survey of the North Sea coasts. Holland produces but little coal for her own use, yet she takes from us only about 2·0 tons, or rather more than a tenth of her total supply. The remainder comes from Westphalia, either by way of the Rhine or carried by rail at special rates. Rotterdam and Amsterdam account for nearly the whole import of British coal. In addition to coal, Holland imports from us considerable

quantities of raw materials and foodstuffs, with iron and steel and manufactures of all kinds. In return, we receive the natural products of the country together with a large quantity of commodities arising out of its important entrepôt business; but the total volume is less than half that of our exports. We might expect to find fewer ships entering our ports with cargo from Holland than clearing to that country. This is so; but, in addition, we have a net entry in ballast of nearly 4·0 tons, including 1·8 tons of British ships alone. The greater part of this tonnage is evidently not related to the conditions of the local trade. Rotterdam, even more than Antwerp, is a market, mainly on German account, for the products of North and South America, the East, the Black Sea, Spain, and Algeria; and we find that the two ports together account for a large part of the difference shown in our diagrams between the clearances from the United Kingdom of British ships with cargoes on the great routes and the corresponding entries.

Holland and Belgium together constitute but a small market for British coal; the largest market, next to France and Italy, is Germany, in spite of its vast native supplies and its export trade. More than half the stream of coal crossing the North Sea is directed to the mouth of the Elbe and ports on the neighbouring coast. Hamburg alone, with its suburbs, takes three to four times as much coal as Rotterdam or Antwerp. In 1912, more than half the ships entering Hamburg from the United Kingdom carried cargoes of coal. In this district, British coal competes with Westphalian on favourable terms, since the latter is handicapped by the long land-journey;

so that the chief seaport of Germany is dependent on us for a large portion of its normal supplies. Any disturbance in our markets at once affects the conditions of competition. During the strike of 1912, coal from Silesia reached Hamburg in considerable quantity, in spite of the high rail-cost; while a moderate rise or fall in prices at once affects the relation between British and Westphalian supplies.

The coal imported at Hamburg is not used merely for bunkering or local purposes. In 1912, about a third of the upstream traffic on the Elbe consisted of coal, and we can trace it both to the industries of the Magdeburg district and by the canal system to Berlin itself. Bremen and Emden, though nearer to us, are also nearer to Westphalia, while Emden has inland water communication; so that this area imports comparatively small quantities from us, but exports German coal, especially coastwise to Baltic ports. The whole coal traffic of Germany is complicated both by the competition of water and rail transport and by the fact that the German railways, controlled by the State, are in a position to offer special facilities for movement or export. The most surprising conditions are to be found in the Ruhr district. There is a heavy export, both by water and rail, to Holland and Belgium, while, at the same time, British coal penetrates, by way of the Rhine, even as far south as Mannheim on the farther side of the Westphalian field.

We will now consider the effect of the trade on the movement of shipping. In addition to coal, Hamburg imports from the United Kingdom iron and steel,

chemicals, and raw materials such as wool in fair quantity, while raw materials and chemicals are exported; but the only single export of great volume is sugar. As a result, in the trade with the United Kingdom, the imports into Hamburg are four to five times the volume of the exports. Coal, as so often, upsets the balance. Moreover, we must not ignore the great entrepôt trade of Hamburg, with its heavy import of foodstuffs and raw materials over the long sea routes. Much of this trade is carried in British ships, from the United States, India, South America, Africa, and locally from Russia; and the inward movement of cargoes from all these markets is far larger than the outward. These conditions are reflected in the statistics of British tonnage; we find heavy entries with cargoes from the Americas and Asia, but much smaller clearances to these regions; and heavy entries from the United Kingdom with cargoes, while over 2·0 tons net is cleared westward across the North Sea in ballast. Some of this last is due to the coal trade, but the rest is the overflow from the long sea routes; so that Hamburg, like Rotterdam and Antwerp, contributes to the great westward flow of ships in ballast across the North Sea which represents the last section of the completed voyage of our ships over the great traffic routes of the World.

We now leave these world routes and consider briefly the local trade of the Baltic and the Scandinavian peninsulas, in order to complete our picture. Of the twenty-five million tons of coal crossing the North Sea, rather less than half is destined for the coasts from the Skaw to Dunkirk, together with Norway, rather more

than half for the region within a line drawn from the Skaw to Frederikstad. Of the latter total, about four million tons each are assigned to Russia and Sweden, and the remainder, about five million tons, is divided between Denmark and Germany.

We will consider first the German supply. Kiel, Lübeck, Danzig, Königsberg, and Memel all import fair quantities; but the largest single market is Stettin, which may in normal years be ranked in this respect with the greater ports of the North Sea. In 1912, the conditions were abnormal. The coal strike in the United Kingdom upset the trade, so that Stettin imported large quantities from Silesia, by the Oder navigation, and even some Westphalian, by way of the Rhine and Netherlands, or Emden. All along the Baltic coasts of Germany, Silesian coal, carried over the inland waterways, competes with coal imported from Britain, and a rise in price on this side or an increase in shipping rates at once favours the native supply. The further consequences of the strike are worth remark. Stettin, normally an importing port and organised for that purpose, exported, for a short period, large quantities to Denmark, Scandinavia, and Russia, and some even to the United Kingdom and as far as Africa. The export to the Swedish sawmills and factories was favoured by the availability of numerous small Scandinavian and German ships, suited to the character of the Scandinavian ports and trade; and the strike had the effect of establishing a new competitor in the coal trade of the western Baltic.

Coal, metals, and grain move down the Oder system to Stettin, ores and manures upwards. Stettin is the inlet

and outlet for the whole region, including, for many purposes, Berlin; but the region has not much to send us, and the ships may return in ballast or scatter over the Baltic seeking cargoes. In respect of coal, the East Prussian group of ports shows the same conditions as Stettin; Silesian coal is always in competition with British, while local industries profit by the efforts of the Silesian producers to capture the market. These efforts were naturally aided by the strike of 1912, and Danzig even received coal from Westphalia. These ports have a special interest as providing the outlet not only for the agricultural surplus of East Prussia but also for the grain, sugar, timber, and flax of the Polish hinterland. The German control is economic as well as physical; not only must the trade pass through German ports, but it is largely in the hands of German middlemen, dealers, and bankers. In return for the coal, there are heavy exports of timber and grain, both to the United Kingdom and to western Germany by way of the Netherlands and the Rhine. This trade seems to be carried mainly in foreign ships, German and Scandinavian.

As we travel eastward along the Baltic coast, the return cargoes become more important. This is most marked when we reach the Russian ports proper. These fall into two groups,—Riga, with its outports and competitors, Windau and Libau, on the one hand, and the ports of the Gulf of Finland on the other. The latter account for three-quarters of the Russian import of our coal. The Russian fields are far distant; and though schemes for cheap transport across the country have been proposed, and coal for the Imperial Navy has been

sent from the Black Sea, all round the coasts of Europe, this part of Russia seems likely for a long time to be dependent on foreign supplies.

Riga, in spite of difficulties of navigation, is the most important port of Russia for general trade. That trade is mainly divided between Germany and the United Kingdom, since much that is credited to Belgium, the Netherlands, and Denmark is only in transit to these countries. Moreover, the district draws its supplies of coal about equally from the two. In the matter of heavy cargoes, we may perhaps offset the import of coal, coke, clay, chemicals, fish, machinery, and miscellaneous raw materials against the export of grain of various kinds, especially oats, and of flax, linseed, and oilcake. In addition, there are large quantities of timber. The forests of northern Russia supply us with about half our total import of hewn timber, including nearly half our pit-props, and with half our supply of sawn timber. Some of this timber comes from the immediate hinterland of Riga; for the rest we must look farther north. In spite of the fact that the ports of the Gulf of Finland take the greater part of the coal imported into Russia, we find that the excess of cargoes outward from these ports is even more marked than in the case of Riga, and that many ships enter in ballast to load. The heavy exports from Finland of timber in various forms, together with pulp and paper, account for much of this movement of shipping. As a result of our dependence on northern Russia for great quantities of raw material, in addition to some foodstuffs, our statistics show that, whether we consider all ships or British ships alone, the entries into

the United Kingdom with cargoes from this region are considerably greater than the clearances direct, while there is a large net clearance from the United Kingdom in ballast. But for our heavy export of coal, we should find the conditions of the Black Sea almost exactly repeated in the Baltic.

The Baltic coast of Sweden, for purposes of transport, may be associated closely with the opposite coasts of Russia and Germany; in fact, as we might expect, much of the trade of the whole region is carried in Scandinavian ships, though, in the Russian trade with the United Kingdom, British ships hold easily the first place. If we examine the statistics dealing with our shipping relations with Sweden, we find that the conditions which we noted in Russia are reversed; there is an excess of nearly 1·0 tons of steam shipping cleared from the United Kingdom with cargoes, with a considerable excess also of ships entered in ballast. This excess is due almost entirely to foreign, especially Swedish, ships, which carry most of the trade. The movement of British ships is comparatively small, but fairly evenly balanced.

We have noted that we export to Sweden as a whole about as much coal as to Russia; but our imports of timber are far smaller, amounting to only about a third of the Russian total, while the pulp, paper, and iron ore are not sufficient to make up the difference. Thus the total volume of our exports to Sweden is much larger than that of our imports from that country, and the fact is reflected in the shipping figures. It is evident that Russia is in a position to provide for some of the overflow of shipping which has carried cargo to Sweden and can find no return.

Let us combine the figures for the two countries and test the result. We find about 4·8 tons of steam shipping of all nations cleared from the United Kingdom with cargo to the two together, but only 4·2 entered, giving an excess clearance of ·6 tons. To this must be added a net clearance in ballast of ·1 tons. At first sight, these figures hardly seem to agree with our conclusion that the Baltic, as a whole, exports a greater volume of goods than it imports. Some ·7 tons of shipping leave our shores for Russia and Sweden, mostly with cargo, but do not seem to return direct. We must add to this the overflow of ballast tonnage from the southern Baltic coast, which has not a great quantity of goods to send outside the Skaw, and we thus have to account for over a million tons of shipping, lost in the Baltic. There is nothing wrong with our argument, if we remember that the chief market, other than the United Kingdom, for the timber, ores, and grain of the east and west Baltic areas is to be found in the Rhine district of Germany. The ships which enter the Baltic, carrying our coal, may leave with cargoes for Germany direct, or more often via the Netherlands; and we shall meet them again, as elements in the great stream, recruited from all the routes of the World, which crosses the North Sea in ballast westward to our shores.

We must not regard the movement of shipping in the Baltic area as being uniform throughout the year; our figures represent only the total result of all months taken together. Many of the Baltic ports are closed partly or entirely by ice for long periods, while the movement of timber for export is in itself strongly seasonal.

The great outward flow from the Baltic is confined to the summer months, from May to October, and this fact is shown, not only in the movement of shipping, but also in the seasonal character of the export of coal. Sweden imports coal from us fairly steadily, except for a few weeks in midwinter; the German imports have the same character; but the Russian trade in the winter months is very small. In 1911, more than five-sixths of our total export of coal to Russia was concentrated in the period from May to October. This seasonal character of the traffic introduces a further complication into the problem of the employment of shipping, and leads in the winter months to a considerable diversion of tonnage to other markets; so that our picture is of great activity for a few months and relative slackness for the rest of the year. To these conditions both the shipping and the coal trade must be adjusted; we have seen such adjustment, on a vast scale, in the case of tonnage required to move the harvests of the different regions of the World.

We have discussed the development and organisation of trade routes on the basis of coal, whether as a driving force for the ship or as a useful cargo with which to fill up on the outward voyage from the United Kingdom. Even on this basis conditions are slowly changing; the radius of British coal tends to decrease owing to the development of alternative sources of supply. Such a decrease has been noted in the case of the export to South Africa and the Indian Ocean. South Africa hardly counts to-day as a market, while we may look forward to a time, in the near future, when our coal will not be sold beyond Suez.

In the New World, on the other hand, competition is threatened from the coal of the United States, both in the Panama Canal zone and on the eastern and western coasts of South America. Any diminution in the export of our coal in bulk to the South Atlantic will result in a modification of the flow of shipping along the American coasts. Indirect competition may be even more important than direct. The comparative price of British coal on the Suez route and American coal on the Panama route is a factor which must be taken into account in any estimate of the future distribution of traffic. The Canal dues may be equal, the distances may be equal, and the prospects of cargo similar, but the total cost of the voyage may be lower on one route than on the other, owing to the lower price or better distribution of coal.

A still greater change is threatened by the wider introduction of the new motive power, oil. The economy of oil, whether used in the furnace or in the internal combustion engine, lies in the decreased space required for the storage of a given amount of energy. A ship using oil, instead of coal, has either a longer steaming distance or more space available for cargo. Other advantages are convenience of storage, ease and rapidity of bunkering, and a reduction in the size of the crew needed to work the ship.

Oil is not distributed about the world in the same fashion as coal, but, if it is to drive the ships, it must, like coal, be stored at convenient points on the great ocean routes. Coaling-ports may become oiling-ports, and the flow of coal to these centres will be replaced by

oil coming from different sources. As the chief coaling-ports of the world are on the shores of Great Britain, the organisation of British shipping, in the absence of natural supplies of oil, would be profoundly affected. North and South America might dominate the Atlantic, while the Indian Ocean region would become of supreme importance for the traffic beyond Suez.

There is another aspect of the question. Much of the coal moved across the sea is not for bunkers, but for use on land, in the working of railways and factories. The development of water-power is already tending to restrict this movement in certain directions; the enthusiastic advocate of oil would have us contemplate the further possibility of the wholesale substitution of oil for coal as a motive power for industries in large areas, if not throughout the world. The idea is fascinating, but we may perhaps be permitted to inquire as to the assumptions on which it is based. Oil may be capable of doing technically all that the engineers claim; the result is not necessarily the extinction of coal. Of coal we have fairly definite knowledge, both as to its wide distribution and its immense quantity. The cost of production may rise, in a given area, with serious results in competitive markets; we may find it advisable to waste less, or to use the power in the coal in a form different from the present; but we need not contemplate the exhaustion even of the known supplies. The world has enough to carry on with for a few centuries. Can we say the same of oil? There are many other uses for natural mineral oil, in addition to the raising of power, and the amount required for such uses is continually growing. A world-

wide increase in the use of oil for power will at once raise in a critical form the question of the extent of the available supply. It is true that new fields are always being discovered, but there are not wanting signs that the older fields, as in Russia and the United States, after a short and vigorous life, are tending towards exhaustion. The first sign of failing is a relatively smaller flow from an increased number of wells, with consequent higher cost of working. We know little of the extent of hidden supplies of oil, and their discovery and working partakes of the nature of a gamble. New discoveries may produce very rapid changes for a generation or two, but this is only a short day in the world's history. Our knowledge of available supplies of coal is based on a whole series of geological data; so long as the evidence as to the occurrence and quantity of oil is no more satisfactory than it is at present, we may perhaps be justified in continuing to look for the main basis of industrial and commercial organisation in the occurrence and utilisation of coal.

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